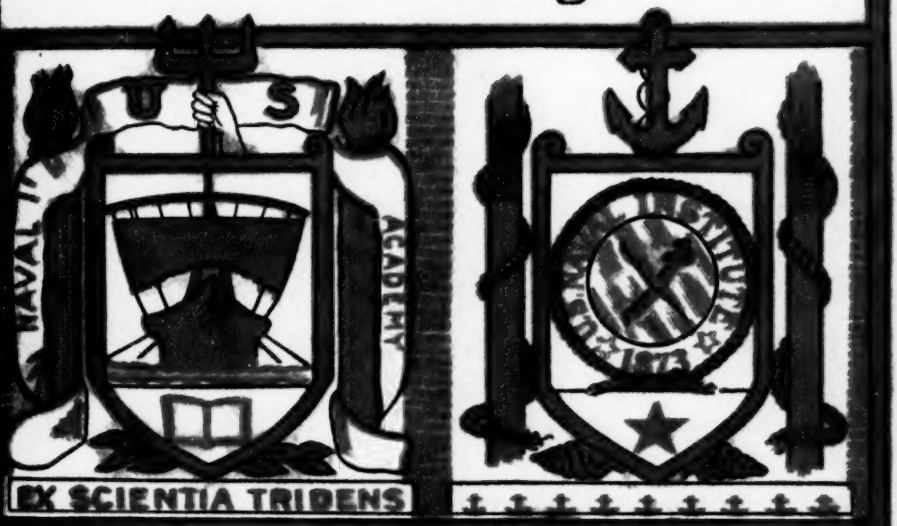
VOL. 43 DECEMBER 1917 No. 178

United States Naval Institute Proceedings



The writers only are responsible for the contents of their respective articles

CONTENTS

	PAGE
Strategy, Tactics, Logistics and Invention.—Fiske	2793
Arctic Duty (Cont.).—Green	2799
"Goeben" and "Breslau."—Bryant	2833
The Pay Corps of the Navy.—Potter	2849
War and Aeronautics.—Beard	2879
Stonewall Jackson from a Naval Viewpoint.—Mayo	2893
What it Means to be an Officer in the United States Navy To-Day.—Washburn	2897
The Loss of the British Motor Vessel "Sebastian."—Wicks	2917
Description of a Battle Trench Pumping Outfit.—Edwards	2921
Secretary's Notes	2927
Professional Notes	2933
International Notes: Naval War Notes	3025
International Notes: Diplomatic Notes	3071
Review of Books	3085
Information Index	2931

Copyright, 1917, by J. W. Conroy, Trustee for U. S. Naval Institute

Entered at the Post Office at Annapolis, Maryland, as Second Class Matter

THE ELECTROSE INSULATION

"MADE IN AMERICA"

LOUIS STEINBERGER'S PATENTS

THE ARMOR LIGHTNING-PROOF INSULATORS

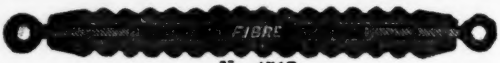
1000 TO 1,000,000 VOLTS

THE ELECTROSE INSULATORS ARE STANDARD WITH

UNITED STATES NAVY and ARMY

AND WIRELESS TELEGRAPH AND TELEPHONE COMPANIES

No. 7490



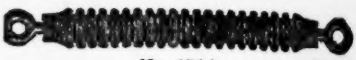
No. 4517

No. 7370

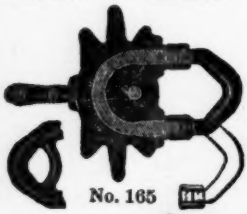
No. 4500

No. 4502

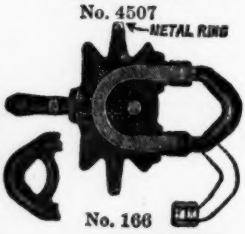
No. 4507



No. 4514



No. 165



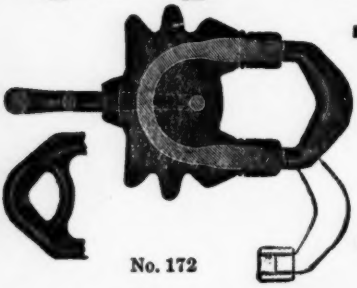
No. 166

No. 9302

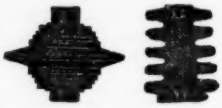
No. 7122

No. 6265

No. 6815

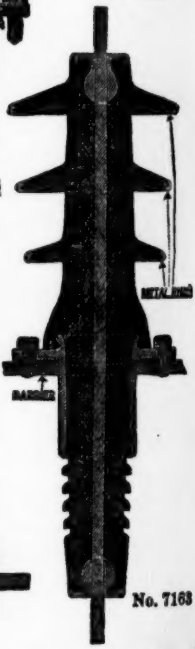


No. 172



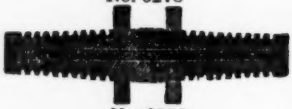
No. 7379 No. 7302

No. 6805



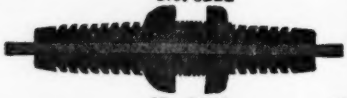
No. 7372

No. 6278

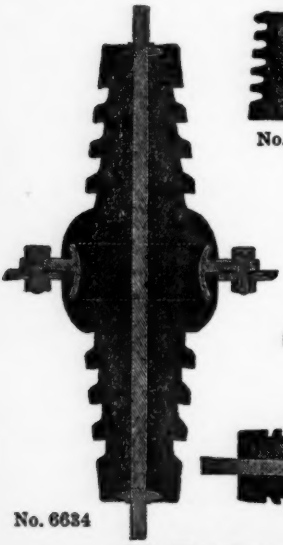


No. 6222

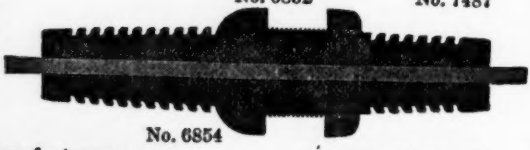
No. 7487



No. 6852



No. 6634



No. 6854

No. 7163

Sole Manufacturers

ELECTROSE MFG. CO.

60-62 Washington St. 66-76 Front St.

27-37 York St. 1-23 Flint St.

BROOKLYN, N. Y., AMERICA

Vol. 43, No. 12 December 1917 Whole No. 178

United States Naval Institute

Proceedings

PUBLISHED MONTHLY
EDITED BY J. W. GREENSLADE

U. S. NAVAL INSTITUTE
ANNAPOLIS — MARYLAND

COPYRIGHT, 1917
By J. W. CONROY
TRUSTEE FOR U. S. NAVAL INSTITUTE

The Lord Baltimore Press
BALTIMORE, MD., U. S. A.

The writers only are responsible for the contents of their respective articles

CONTENTS

STRATEGY, TACTICS, LOGISTICS AND INVENTION. By Rear Admiral Bradley A. Fiske, U. S. Navy.....2793

ARCTIC DUTY; with the Crocker Land Expedition (Continued). By Lieutenant Fitzhugh Green, U. S. Navy.....2799

"GOEBEN" AND "BRESLAU." By Lieutenant (J. G.) S. F. Bryant, U. S. Navy 2833

THE PAY CORPS OF THE NAVY. A Sketch. By Pay Inspector David Potter, U. S. Navy.....2849

WAR AND AERONAUTICS. By Wm. E. Beard.....2879

STONEWALL JACKSON FROM A NAVAL VIEWPOINT. By Lieutenant Commander C. B. Mayo, U. S. Navy.....2893

WHAT IT MEANS TO BE AN OFFICER IN THE UNITED STATES NAVY TO-DAY. By H. C. Washburn, Instructor, U. S. Naval Academy.....2897

THE LOSS OF THE BRITISH MOTOR VESSEL "SEBASTIAN." By Ensign Z. W. Wicks, U. S. Navy.....2917

DESCRIPTION OF A BATTLE TRENCH PUMPING OUTFIT. By Lieutenant W. A. Edwards, U. S. Navy.....2921

SECRETARY'S NOTES 2927

PROFESSIONAL NOTES 2933

INTERNATIONAL NOTES: NAVAL WAR NOTES.....3025

INTERNATIONAL NOTES: DIPLOMATIC NOTES.....3071

REVIEW OF BOOKS.....3085

INFORMATION INDEX 2931

OFFICERS OF THE INSTITUTE

President

REAR ADMIRAL BRADLEY A. FISKE, U. S. NAVY

Vice-President

CAPTAIN E. W. EBERLE, U. S. NAVY

Secretary and Treasurer

LIEUTENANT COMMANDER I. C. KIDD, U. S. NAVY

Board of Control

BRIGADIER GENERAL JOHN A. LEJEUNE, U. S. MARINE CORPS
CAPTAIN L. M. NULTON, U. S. NAVY
CAPTAIN G. W. LAWS, U. S. NAVY
COMMANDER W. T. CLUVERIUS, U. S. NAVY
COMMANDER JOHN DOWNES, U. S. NAVY
NAVAL CONSTRUCTOR J. A. FURER, U. S. NAVY
LIEUTENANT COMMANDER I. C. KIDD, U. S. NAVY (*ex officio*)

PAST PRESIDENTS

OF THE

U. S. NAVAL INSTITUTE

Admiral DAVID D. PORTER, U. S. Navy, 1873

Rear Admiral JOHN L. WORDEN, U. S. Navy, 1874

Rear Admiral C. R. P. RODGERS, U. S. Navy, Jan. 1875–Jan. 1878

Commodore FOXHALL A. PARKER, U. S. Navy, Jan. 1878–Jan. 1879

Rear Admiral JOHN RODGERS, U. S. Navy, Jan. 1879–Jan. 1882

Rear Admiral C. R. P. RODGERS, U. S. Navy, Jan. 1882–Jan. 1883

Rear Admiral THORNTON A. JENKINS, U. S. Navy, Jan. 1883–Oct. 1885

Rear Admiral EDWARD SIMPSON, U. S. Navy, Oct. 1885–Oct. 1887

Rear Admiral STEPHEN B. LUCE, U. S. Navy, Oct. 1887–Oct. 1898

Rear Admiral WM. T. SAMPSON, U. S. Navy, Oct. 1898–Oct. 1902

Rear Admiral H. C. TAYLOR, U. S. Navy, Oct. 1902–Oct. 1904

Rear Admiral C. F. GOODRICH, U. S. Navy, Oct. 1904–Oct. 1909

Rear Admiral RICHARD WAINWRIGHT, U. S. Navy, Oct. 1909–Oct. 1911

SANDERSON'S HOPE IN JULY, THE FAMOUS LANDMARK AT UPERNIVIK

UNITED STATES
NAVAL INSTITUTE
PROCEEDINGS

Vol. 43, No. 12 DECEMBER, 1917 Whole No. 178

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

STRATEGY, TACTICS, LOGISTICS AND INVENTION

By Rear Admiral Bradley A. Fiske, U. S. Navy

Perhaps no four words are more vaguely understood than the four words that head this page.

Strategy comes from two Greek words: *stratos,* an army, and *agein,* to lead. These two words were combined in the Greek language to form the word *strategos,* which we translate by the word "general." Among the many definitions of strategy which are given, the one that preserves best the original meaning is "the art of the general"; that is, the art of leading armies. By giving a slight extension to the meaning of this definition, we may say that strategy is the art of handling large warlike forces; military strategy being the art of handling armies, and naval strategy the art of handling navies.

No single word has the same meaning as applied to any civil vocation that strategy has, as applied to the military and naval vocations. A man at the head of a large business organization must handle that organization, both as a whole and as a number of parts, according to certain principles of business management; but no single word names the art he exercises. The same remark applies to a politician in handling his political forces in a political campaign; no single word names the art he exercises. A like statement may be made concerning the handling of any large organization whatever, be it social, educational or religious; no single word names the art that is exercised. In order to indicate any one of the arts that is exercised, the word "strategy" is used

with some appropriate adjective; for instance, we read of "political strategy," "business strategy," "ecclesiastical strategy," etc.

One thing which has clouded the meaning of the word strategy is the word stratagem, which is a word also derived from *stratos* and *agein*, and expresses one of the efforts of strategy; the effort to mislead or confuse the enemy by the use of some ruse, trick or novel method or procedure.

Another thing which has clouded the meaning of the word strategy is the line of distinction between strategy and tactics which some writers have drawn with such sharpness as to suggest the idea that the two arts have nothing in common. The accepted idea is that strategy is concerned with the preparation of armed forces until they come within sight of each other; and that tactics steps in then and takes the armed forces away from strategy and handles them itself.

It is, of course, essential that a distinction be made between the handling of forces in actual battle and their preparation beforehand; but it does not seem quite clear why tactics should be supposed to operate in battle only, when we know that it is not only in battle, but also before battle, that fleets and armies are tactically maneuvered. Neither is it clear why strategy should not operate during a battle as well as before it. Certainly a battle should be fought according to the principles of strategy; unless we divorce strategy altogether from its original meaning, the art of leading armies, and forget that armies are led in battle as well as before. Surely tactics cannot be so conducted as to further the aims of strategy, unless it is in consonance with its principles. Surely strategy and tactics cannot co-operate in sympathy, if too sharp a line of division is drawn between them.

Another thing which has clouded the meaning of the word strategy is the word logistics. It is not very many years ago that nearly all of the effort of logistics was to provide the food, ammunition and fuel for an army or a fleet. But the enormous advance of the engineering arts during the last 50 years has so increased the number of things to be provided, especially in the way of complicated mechanisms, that logistics has assumed an importance far greater than it had before. When Alexander took his 35,000 men to Asia, and when Cæsar took his legions into Gaul, the logistic problems were of a simple character. But when Napoleon took his army into Russia, the logistic problems were of such

enormous difficulty that even Napoleon failed to master them; and his failure to master them caused his failure to invade Russia, and his consequent failure to keep his throne.

The same reasons which suggest that tactics is not separate from strategy but rather included in it seem to indicate that logistics is not separate from strategy, but rather included in it. No *strategos* can exercise the art of strategy successfully if he does not consider simultaneously the requirements and limitations of tactics and logistics; his strategy cannot be complete, his conclusions cannot be safe, if he does not include tactics and logistics in his study.

The art of war and, equally, the science of war, are usually regarded as comprised under three heads, strategy, tactics and logistics; but have we not omitted in this analysis one factor which is not only important, but distinct, the factor of invention? The word invention is usually applied to mechanism; we speak, for instance, of the invention of a machine or instrument. But this is using the word invention in a limited sense, and is applying the idea of invention to one line only of its activities. Shakespeare said, "Oh, for a muse that would ascend the highest heaven of invention"; and we frequently hear it said of a novel, poem, or piece of music, that it shows little or no invention, meaning that there is a paucity of new ideas in it. This shows that, although we ordinarily use the word invention in a restricted sense, we are subconscious of the fact that we do use it in a restricted sense, and know that invention is continually being applied to things other than mechanical.

Now a man may write a very good book and not put any invention into it; for instance, he may write a dictionary. A man may design an excellent engine, may construct an excellent ship, may even paint an excellent painting, and put almost no invention into his work. Similarly, a man may maneuver a fleet or an army, and may even fight a battle, with very little exercise of invention. Furthermore, he may plan a campaign on land or sea, or lay out a scheme of strategy covering both peace and war, and not use much invention.

But if a man does any of these things without using invention, no matter how good his work may be, he does only things that have been done before; and if his work comes into competition with another man's work that is equally thorough, but is characterized

by invention, he is sure to be surpassed. No matter how good a book a man may write, no matter how fine a poem or opera he may compose, no matter how complete a war plan he may devise, it cannot possibly be as effective as another which is made with equal care, but vivified by invention's spark.

We, of the United States, are deeply impressed with the great work invention has done in advancing the mechanic arts, during the 50 years gone by. We, of the navy, keenly appreciate what invention has done in giving us (and our possible enemies) weapons with which to fight. But *do we quite appreciate the fact that it has been some new invention which has caused most of the surprising triumphs of war?* Such invention may have been in mechanics, like the *Monitor;* may have been in method, like von Moltke's conception of organized preparation for war; may have been in flashes of seeming inspiration like Napoleon's, which enabled him to start his armies along new lines almost instantaneously; may have been in a genius-given insight into the possibilities of some existing but underestimated weapon, like that of von Tirpitz as to the submarine.

That we do have an ill-defined appreciation of the usefulness of invention, even in ways non-mechanical, especially in the navy, is shown by the fact that we speak of a man sometimes as being a man of great resourcefulness; meaning that he can promptly decide upon some plan, when he suddenly finds himself in a position in which he never found himself before. This idea was more in vogue in the navy in the old sailing-ship days than it is now; because the uncertainty of the propelling element, the wind, brought about unexpected conditions very suddenly. But during the past 20 years, since machinery has come so much into use with its rigid methods and its mathematical formulæ, and especially since we have at last awakened to the efficacy of the German methods of thorough detailed preparations in advance of war, have we not come to regard warfare too much as a science and too little as an art; do we not belittle inventiveness too much; do we not underestimate the importance in strategy of stratagems?

Let us realize that in the present war, as well as in the past, the unexpected act, the doing of something not written in the books, has played an important part. It was the unexpected falling on top of the Belgian forts of large masses of high explosives that

made the conquest of Belgium so comparatively easy. It is the unexpected efficiency and aggressiveness of submarines that now threaten the food supply of England. It was the introduction into Troy of the possibly legendary wooden horse, that, according to the best accounts we have, brought about the fall of a city that had long resisted the valor and skill of the besieging forces, when exerted along the lines of orthodox procedure only.

The more daring the invention in conception and execution, the more decisive the results have been. The invasion of Asia by Alexander, of Gaul by Cæsar, and of England by William of Normandy, stand out clearly outlined in our minds. So do the crossing of the Alps by Bonaparte, and of the Delaware by Washington. So does Farragut's forced entry into Mobile Bay; so does the quick return of Nelson from the West Indies, and the resulting Battle of Trafalgar; so does the brilliant dash of Washington from New York to the Chesapeake, and the resulting surrender to him of Cornwallis.

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ARCTIC DUTY

WITH THE

CROCKER LAND EXPEDITION

(CONTINUED)

By LIEUTENANT FITZHUGH GREEN, U. S. Navy

SOUTH GREENLAND

Greenland is going to have her chapter in naval history.

Months-long winter nights may blind men. Bitter cold and ice and snow may hinder them. Yet fleets shall police the seas with deep Greenland fiords on their home chart lists. Greenland coal shall fire their boilers, and her graphite ease the scramble of their pounding engines. Who can deny that vast industrial laboratories shall rise among the glacial ruins of her southern coasts where cold and sunshine in their seasons are cheaper even than sea water?

There are already cattle in the grassy inlets above Cape Farewell. Every year new mineral veins are being discovered. The Danes have used our engineers in their cryolite mines and for coastal surveys. Wireless stations have been planned. Vast halibut, cod and whale fisheries are being organized. Slowly but surely the 10,000 southern Eskimos are assimilating civilization. Schools spread yearly. One large academy is the pride of Godthaab. Ivigtut will have a direct line of steamers to New York. Skins and oils from Disco Bay district bring in hundreds of thousands of kroner a year. Greenland and its peace-worshipping people are being marshalled under the colors and course of Danish idealism, which, when analyzed, is truly the strong, free independence of a liberty-loving race.

This naval Greenland is 1000 miles south of the arctic regions we explored. Its people know our little band of savages only by tradition. Very properly I have written of our tribe and of our dogs and of frost bites, for such adventures are ending. I venture

to predict this very record is among the last handful that shall ever be made of struggling, foot-sore marches and all the lugubrious incapacities of us old-fashioned explorers. We are entering upon a new era in scientific investigation.

Aviation has come to stay. As the auto has displaced horse and wagon from city streets, so shall birdmen soar laughingly over the wastes of snow or sand through which we pioneers crawled in miles and meters per day. A phase of man's world mastery has passed. These pages and a few others are the closing words of a great tale. Read them not for what they are but for what they mean, as transition from the old to the new, from the weak to the strong, from a tangled trace to the whirring blade and its following wings.

One more point of professional interest. Though the world has become a very trite sort of place compared to the old, wild days of colonization, we navy men may yet live to father a savage tribe. The Philippines and Samoa have a new meaning to me since I lived through Danish rule on the Greenland coast. We all can learn a lesson from their success.

So I risk a prolix paragraph on our last months north. Few more such paragraphs shall be lived. But I justify the prologue by this surety of fact: Navy will come to mean police; and this is, in turn, patrol. Patrol stations, military as well as commercial, will fleck South Greenland shores in future years. Follow me down the coast and judge.

In September, 1915, Dr. E. O. Hovey, curator of geology at the American Museum in New York, brought the auxiliary schooner *Cluett* to our rescue. We were delighted to be going home—not the ecstatic joy of deliverance, nor yet the forced optimism of philosophical capitulation. We were just plain glad to be off. Two years had given us pretty nearly all the arctic had to give. All the keen, healthy pleasure of sledging and hunting and living with the Eskimos had been ours. At the same time it all had been thrown into a kind of satisfying relief by the inevitable pain and disappointment which trespass on the polar wilderness entails. Though we were strong in our love for the life, no less poignant was our almost fretful desire for friends and food and the many follies to which civilization beckoned us. Dr. Hovey's arrival meant them all—"Within two weeks," we gayly promised ourselves.

Perhaps those two weeks ensuing were and will be the most exciting I have ever lived. I am inclined to hope so.

Two weeks later the *Cluett* was nearer New York by quite a few miles. But she was still in Greenland—in the ice, rudder crushed, crank-shaft broken, and daylight peering through her stove-in side timbers. She must winter north. We had been provisioned for but two years. Yet by the *Cluett's* failure not only were we forced to face another winter, but 17 additional men must be fed and clothed, and that with the scanty supplies on hand. The outlook was serious, not so much for us of the expedition who had learned to live like Eskimos, but for the vessel's crew, who were poorly clad and not thoroughly instructed in the ways and means of cold, dark, arctic winters.

It fell to my lot to leave the *Cluett* on September 26, 1915, and travel almost constantly until June of the following year. The first traverse of this nomadic existence was to Etah, nearly 200 miles north, for skins and food. My companions were dogs, Eskimos and the autumn moon. October blizzards of unvarying violence caught the party several times on the ice cap, and once open water nearly put an end to our plans. But by Christmas day I was back in North Star Bay, the first inlet above the *Cluett's* "hole-in-the-wall" (Parker Snow Bay).

Until January 13 the darkness, coupled with several violent gales, imprisoned not only our bodies but our minds. For somehow or other one's initiative and imagination seem to dwarf and to numb in the black monotony of arctic night. Though our impatience grew to bitterness, we were mostly engaged in futile disputes about such matters as fit of mittens, broken needles, the relative rottenness of walrus and narwhal meats, the short syllable of a long Eskimo word and so on *ad nauseam*. We planned to go, but who, and when, and where, were, up to almost the last minute, unsettled problems.

Some of us had to leave. Inadequate food and quarters on the ship made the crisis doubly acute. Choice finally came to Dr. Hovey, Tanquary, Allen and me. We would cross Melville Bay to Upernivik, some hundreds of miles south, and work our way through the South Greenland Eskimos in hope of catching the little Danish mail steamer which came each summer to Disco. Even if we were delayed some word of the *Cluett's* plight might be dispatched to New York, and help sent in time to save our friends.

On January 13 I once more boarded the little ship after nearly 500 miles of sledging. The sum total of our four months' achievements was enough pemmican to tide us over the first stage of our intended journey, and skin clothing sufficient for the whole party. MacMillan had, of course, bargained with the best drivers for our support, and had secured dog food (frozen seals) for the teams.

I was lucky enough to have my own team and sledge, which added much to the pleasure of the trip as well as to my own safety. In the arctic one carries fuel and hunting equipment on his load so that in any emergency he is absolutely independent of the others. In storm or broken ice separation can easily and with tragic suddenness throw a man absolutely on his own resources. Of course there is the added work and worry of mending harness and untangling fiendish knots of frozen traces. But by and large I'd rather die fighting my own battle than win with the skill and strength of another. Which is no aspersion on the three who must trust their native guides, because even Dr. Hovey, who was not yet hardened to raw meat, lice and igloos, would have sold his soul for a whip and team and the schooling to use them.

One unforeseen shadow marred our departure. Allen's driver was Toiteaq. This single Eskimo had more trial and tragedy bound up in his personality than any four others of his child-like tribesmen put together. Either his family was starving, or his dogs dying, or his harpoon lost. Never was he out of the clutches of the Almighty Devil. His wife was blind in one eye and his baby a "sick-seal" (cried all the time). And when fate (or the Devil) ran out of misery to bestow upon Toiteaq, he made some of his own.

One night he slipped into the house at Etah, to get warm, I thought, for his blubber lamp was never full. He settled gloomily into a chair. His silence was nothing unusual, but the grunts he gave soon irritated me into dropping my work. I suppose that with the three months gone, and walrus not yet come, my nerves were a little on edge.

"What is it now?" I began.

No answer.

"Has the king dog died, or thy igloo's roof fallen in?"

No answer.

"Toiteaq," this time in English, of which he knew not a word, but which sometimes impressed him by its strangeness, "I am preparing an original treatise on the habits of the soft-shell crab. I am distraught, wisdom evades me, knowledge has fled, and will-power—"

The Eskimo stirred and shrugged his shoulders under my hand. "Perhaps, white man, thou dost implore Torngaksuaq to free me. 'Tis of no avail. I must suffer, for I have eaten a whole fox, even to his tender tail and paws."

And he did suffer; for a full-grown fox carries perhaps 8 or 10 pounds of meat and fat, too much even for a pot-bellied Eskimo to devour at one sitting.

Worst of all Toiteaq had fits of *pibloktoq*. So trifling a matter as the breaking of a harpoon point or the perverseness of an untrained pup would throw him into a wild spasm of contortioned song and dance, until finally he fell exhausted in the snow. And, of course, he was then no good the rest of the day. But in normal periods he was a capable driver and hunter, and two years' intimacy with his freakish nature had given us confidence to select him as a member of our party.

Sudden joy at the news immediately capsized his naturally unstable equilibrium. He had a fit. It was at Karnah, a settlement of four igloos. He became successively (so he imagined) a walrus, a bear, a king dog and finally the Devil himself. Which would have been highly entertaining in a padded cage on the Hippodrome arena. But in a small and excitable community in the dead of a Greenland winter, just as we were making frantic efforts to escape the clutches of awful weather threatening even then, and when every minute counted in the final success of our really hazardous plans, the performance was unendurable. I can smile now, but at that time I longed for a yard-arm out which I might string this raving lunatic and choke him into sanity.

Finally he collapsed. Everybody collapsed; for it is no mean job to restrain a madman. We slept for once; even the dogs slept. But we awoke to even more terrible misfortune, for it was more intangible; Toiteaq had come to, sat up, and in the voice of some one that had died the year before (so Elaytuk said) had predicted the *end of the world!* And the tribe, man, woman and child, took his word for it.

What is the poor white man going to do? It's the same in Africa or India or the South Sea Islands as it is in Greenland. When one gets mixed up in local witchcraft the sublime heights of diplomacy and the somber depths of human cunning both bow before the impenetrable obscurity of savage superstition. There is one loop-hole—tobacco. Although our Eskimos had got it only spasmodically from Peary's expedition, they had learned to love it; and by it (six sticks of Battle Axe plug) we averted the greatest disaster in the history of our planet. Toiteaq agreed to defer the final catastrophe at least until we had reached South Greenland and had conferred with the white medicine man (the Danish missionary). Once more we felt secure, because what the missionary might not accomplish, surely lay within the power of the Danish schnapps in his cellar . . . . as proved eventually to be the case.

January 17, 1917, we finally set out from the *Cluett* and swung around into the sea ice for Cape York nearly 50 miles south. At the last moment we found several tins of our precious pemmican had been stolen from their cases. We had no doubt this was the work of our starving sailors, but had not the heart to follow it up. Moonlight and a stern wind made the 12-hour march a pleasant one. Every man was in good spirits to be off, and our dogs in very fair shape considering the cold weather and lack of food. The thermometers showed about 55 degrees below zero, but we were so used to the Etah blizzards that this comparative calm seemed almost spring-like.

Dr. Hovey, however, though in no way out of condition, was not inured to the protracted nervous strain of dog travel. Constant whip and shout, periodic struggles through pressure ice, and the interminable bouncing, jolting, banging and crashing, wear down a green man far more than he realizes at the time. And little points about conservation of body heat by protection of wrists, forehead, neck and knees, come only after long experience.

On our arrival I helped Dr. Hovey off with his *kooletar* (caribou-skin shirt). Though over 50, his life had been much in the mountains. In fact, nearly all his scientific work had been far afield; but, as the eldest in our party, we conceded to him certain care and respect which grew out of admiration for his tenacious courage rather than any sort of condescension to his weakness.

I did notice he seemed more fatigued than was natural after the easy day we had had. "Well, what do you think of a *komotik*

(sledge)?" I inquired, while we beat the snow out of our bearskin breeches. As he took the *teeduktoq* (snow stick) I noticed his hand shook. "Great stuff," was the answer—a little forced I thought. When he stooped to enter the igloo, I realized he was none too steady on his pins. Something was wrong.

Four families lived at Cape York. Narwhal in summer and bear in winter are the attractions. But natives cannot live here permanently since there are no caribou, of which the skins are a necessity for clothing and sleeping bags. Also natives, men particularly, grow quickly tired of the restricted diet. All the ducks, gulls, auks, kittewakes, sea pigeons and dozens of other varieties of food found further northward, seldom scent the soapstone pots of Cape York igloos.

Our four white men and seven Eskimos jammed the igloos full. Great was the jubilation; for none in the whole wide world loves company more than do these happy little groups of blubber-soaked savages.

I was the only white man in one of the snow-buried stone houses; and, with the uproarious company, soon forgot to worry about our future. Next morning I went out early for a look at the weather. I met Tanq helping Dr. Hovey up the steep bank above the ice foot. The older man's nose was frozen white, and he spoke with great difficulty. At the igloo's entrance he collapsed. The unusual cold and exertion had proved too much for his years.

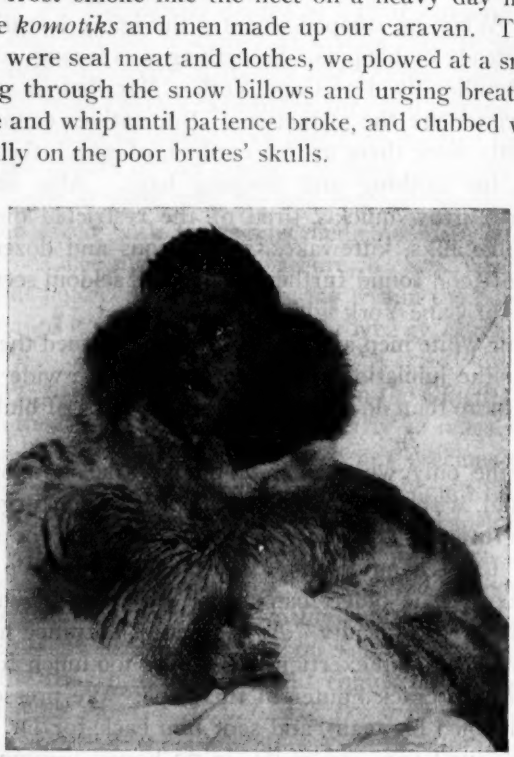
Ivik was the crack hunter of the Cape. We pressed him into service, doubled his team, and sent him back for Dr. Hunt. He made the round trip, 100 miles, in 22 hours, bringing back Ek. Dr. Hunt had gone north the same day to tend Ooqueah, recently injured by tumbling off a 50-foot glacier face.

And to cap our misfortunes snow came, soft, heavy, gluey and deep, deep, deep—while dogs lay and ate the meat upon which depended all we had planned.

But it came right in the end. We dissuaded Dr. Hovey from his feverish determination to proceed at any cost. Should he do so and we fail on his account, then must he be blamed for harming those on the ship who depended on us to send for help. It hurt, but he stayed; and, to the expediency of our plans, sacrificed two years of profession and of personal comforts. And he had only two suits of underwear to do it on! Which all goes to show . . . .

On January 20, after an immense amount of discussion (which ended by my assuming the business liabilities of a penniless party),

we got under way. Out into the shadowy wastes of Melville Bay we drove, trailing behind us through the night a gray, winding ribbon of frost smoke like the fleet on a heavy day in summer. In all, nine *komotiks* and men made up our caravan. Though our only loads were seal meat and clothes, we plowed at a snail's pace, floundering through the snow billows and urging breathless dogs with curse and whip until patience broke, and clubbed whipstocks popped dully on the poor brutes' skulls.



DR. HARRISON J. HUNT

All this is very vague. I mean it to be vague. Melville Bay in January is the vaguest thing in the universe. No landmarks in sight, no trail to follow; moon and stars and pale twilight deep in the night fog of unspeakable cold; vast looming icebergs without outlines or limits; no single shadows, but one deep, meaningless, oppressive, suffocating shade which chokes and blinds and crucifies.

Did I write otherwise than vaguely my story would not be true. I wish you to see, to feel with me, the depths of those sunless days. Our bucket of boiling tea and lump of frozen pemmican in the morning; our bucket of boiling tea and lump of frozen pemmican in the evening—12 hours later, I should say, for we had no such

thing as a. m. or p. m. M. means midnight there, a midnight so unending that *ante* and *post* make only a cruel satire on what we had not. Cold feet, icy bags and pitiful little three-man tents to house six through a drift that hurt even the dogs. Not once did we find snow for igloos—too soft always. "The Almighty Devil," of course; but, curse his idiotic tortures! we *would* beat him; and we did. Details, yes in words; but in our wretched lives no. So much deeper was reality. Even southward of this the dim light of coming sun was but a torment of broken promises—broken every noon when it *didn't* come. I still have a page of my note book scrawled one night by the light of a guttering candle. "Few phases of this life," it begins gravely, "are more terrible than the shortness of day which vexes us on every march. To start in the breaking of dawn is natural and easy. To glow in the hopeful brightening of a rosy horizon is human. But, alas, the sun never rises!

"So near, so divinely near—and yet . . . . deadly is the suppression of every shade, the quick and death-like termination of the promised day, which fades so suddenly and so surely to early twilight and to heavy darkness. 'Just till four o'clock,' one says to himself; 'surely we can keep on that long and count the march seven hours.'

"But blindness creeps upon us. Invisible grow the drifts. Every irregularity is smoothed out to a dull, colorless, intangible mass, through and across which we stumble painfully. The men, drunkenly tired, murmur protests. 'There may not be another berg' (for fresh-water ice). The one we just passed is already gone. With an effort I, the leader, make out 3.30 on my watch. 'Next one,' I say to Egingwak, who wreaks his discontent on the shrunken dogs. There it looms in a mile away. No . . . . seems so. But—why, 50 paces can reach it!

"Down drop the exhausted teams. Knife and hitch-strap come clumsily—awkardness of muscle, weakness and fatigue—off the upstanders. 'Some day'—even thought comes wearily—'some day I shall look back and . . . .'"

And what? Write, yes: write as I write now; no beginning, no end nor body to what I write. But only blindly hoping that another man, one sensitive soul in all who read this aimless soliloquy, shall grasp the inner meaning of it, the burnt-out passion of it, oh! all the inhuman subtlety of its agony; and know that I—

we—lived through it unscathed. Is it not something, my friend, in these tumultuous times to learn there is that in us which even death itself cannot consume?

Now let's get down to earth for a bit.

Greenland is an ear-shaped terrestrial tart, covered thickly by white icing. Two-thirds up the west coast some Plutonic lad has taken out a great bite, and the icing has drooled down through and across the crumbly brown cake beneath. This bite is Melville Bay. More consistently here than anywhere along the coast glaciers flood over the granite remnants of land, leaving only an occasional island or a scarred cliff's shoulder.

Darkness and fog forced us to travel by compass. But leads and screw ice twisted our trail into a double grapevine of meandering sledge tracks. About 150 miles of direct traveling would have taken us to Cape Seddon where we expected to meet Eskimos. But the compass was erratic, sluggish and far out of true.

Consequently, on January 26, when a great headland bulged unexpectedly out of the mist, we cheered without any real meaning in our enthusiasm. "Tutuliksuaq!" cried the natives, and swung in for the shadow. By the time I caught them their dash had become a walk. Then they stopped. Toiteaq came over to me. "Perhaps a white man shall name the direction," he suggested, "using the small magic box." So they had some faith in the compass after all. I got it out of my sledge bag. The land in sight bore nearly northeast true. Impossible we could have passed Cape Seddon, I thought.

Just then Nesetelahsok ran up. "See, it is up there!" He pointed still further north. "I have dwelt at the place of many caribou (Tuktuliksuaq)" he added conclusively, "and I know."

It was bad enough to have them contradicting one another. But when Kudluktoq thrust his frosted face into the gesticulating circle and insisted that we at least land here and hunt, for the sake of our starving dogs, the dilemma became horned like the many-tipped antlers of an Ellsemere deer.

I could talk Eskimo considerably well; ask for meat and drink, and debate the weight of walrus and narwhal. But high-velocity geographical dispute was a little beyond me. I cornered Tanq and Allen. "Who's right or wrong," was my argument, "makes little difference. We are going south if we have to eat every dog and chew their leather harnesses."

Which may seem boastful; but we were up against it good and hard. Our drivers cared most about seeing their friends. To us travel was the objective; not merry making in an igloo but *miles*. Suppose we had passed Cape Seddon; suppose the dog food we needed were not got. We even imagined dragging little back packs over the ice. But we must go on. And despite the clamor of furious Eskimos we did go on. That the natives followed was due to Toiteaq, who at first had been the strongest objector. He happened to notice that one end of the compass needle pointed exactly in the direction we white men wished to go. That was sufficient to convince his superstitious mind. "The Devil moved the needle—the needle pointed onward—then onward must we go," was the substance of his speech to the others. Hearing this I picked up the compass to see just what he meant. The needle was *clamped!*

I had learned a lesson. After that whenever there was any disagreement about the course I simply made up my mind, screwed the needle down to the right bearing, and showed it to Toiteaq. His eloquence did the rest.

Three more marches we kept on south. Leads and bad ice with darkness warned us not to venture too near the shore. Constant complaining was the only solace we got from our men. They were wild to see the two families at the Cape. This land, they explained, is really not the Innuit's hunting grounds. But Samik of Umanak had vowed he'd kill Miterk, the humble son of a wicked old *Angekoq*. Native logic in a case like this is too obscure to bother with. But the frequency of such feuds through all primitive tribes gives value to the Danish solution of the problem. First convince the would-be murderer that reasons and causes for his misfortunes do not come from without, no matter how many magicians are set against him; and produce either in his person or in his own home some suitable origin for the trouble; a wart will do, or a burst of temper, or even a general melancholy in the family. Then teach him to eradicate this hypothetical hoodoo. Not only bloodshed may be averted in this way, but actual Christian doctrine instilled.

Not knowing all this at the time, we little appreciated the men's true feelings. Some idea of this anxiety came when one night Pingasut with an impressive gesture pointed to a peculiar form of aurora hovering over the black cliffs southeast of us. "'Tis death

I see," he announced; "and since but three live there who might die (women didn't count) but two shall we find."

A gloomy speech indeed, but it signified the natives' acceptance of the fact that we were making Cape Seddon after all. We did make it on the tenth march, in a night inky black except for the cold and distant stars. How good the strong meat odors were! Men and dogs dashed up over the ice foot towards the faint glimmer of an igloo's seal-bladder window.

Strangely quiet, I thought. Then I made out the figures of men, women and children standing in a silent line before the house. My heart gave a queer jump sidewise. I counted the men. There were but *two*.

Inutaq had drowned in his kayak; "just when the little auks went south," they said, "was the time. We got him ashore. He was alive, for he moved and breathed. But oh, so terribly he choked until, alas, he lay still."

Before we left we instructed both men and women in resuscitation of the drowned. Had they but known the fundamentals Inutaq would no doubt have lived.

Nor was this all. Etukeshuk had crushed his foot under a large boulder and was still too lame to drive. Miterk, the third man, was in agony with acute rheumatism. As is the custom when a man seems dying, his wife had turned in with him, and met him fifty-fifty, moan for moan—'twas a cheerful chorus! If he died the men would bury him under the rocks. But she must see to it that his harpoon, kayak and other belongings were piled atop the grave. His team would be led alongside and killed. Thus was the hunter properly equipped when just over the great divide. And that he might be cheered before getting out of earshot his wife would be compelled to lament audibly for the five days following death. But so soon as the time was up, immediately must she assume a cheerful mien and cast about for another mate. Which seems a pretty good plan altogether, when you think it over. I must add that, when the new husband takes charge, one of his first duties is to go up on the hill and replace the good harpoon and other hunting implements by small toy-size ones. As you readily perceive, *size* must mean nothing to a spirit of whom the figment is less than a frosty breath. Five days we spent here, all sleeping, eating and drying. Miterk (much to his wife's chagrin) didn't die, but thrived on a daily dose of morphine which I gave him from

my pocket outfit. The last 48 hours I gave him only water in the syringe and found it worked as well to relieve his apprehension. On my departure I presented him with a dozen pink pills which I swore to him contained the same magic compound he'd received by needle. Mental science has done more wonderful things than cure rheumatism with pink liver pills.

We were able to procure several seals and lumps of narwhal meat for the dogs, and large bear joints for ourselves. A little tobacco did for payment—their first for an age, and their last, I am afraid.

The first night out proved that our dogs had not recovered from the stiff work the two weeks previous. The weakest had already died. We decided to lighten loads, which in the north means a kind of clear-for-action. Absolutely every fraction of an ounce that can be spared is thrown away. We got rid of old clothing, spare whipstocks, two tea tins, a biscuit case, extra lines and a harpoon. We even cut the flippers from our seals, and double-fed with what was left. Last of all we went through our little personal bags. I had about two ounces of photographs, a diary, hypodermic case and a small aluminum bottle filled with whiskey. Usually we carried nothing of this sort, and we never used it when we did. So I started to throw it out into the dark. Some evil demon stayed my hand. "Give it to the boys," was the whisper I heard. "It won't hurt them."

I listened and was lost. The Eskimos drained the tiny flask. Most of them had never even tasted liquor of any sort before. Their stomachs were empty and their bodies weary after the long march. At this instant a team happened to break loose. Thirteen dogs dashed for the flimsy tent, inside which the little oil lamp flickered and hummed. Five Eskimos sprang for their whips. Down went the tent, pot, stove. Suddenly Eginqwak shrieked—I don't exaggerate—he let out a blood-curdling cry that echoed from the berg towering over our camp. Pandemonium of dogs took up the chorus. Toiteaq, of course, went *pibloktoq*. Pingasut simply spun about cracking his whip like a repeating rifle, only even more dangerous in the dark.

And the worst of it all was that poor Tanq and Allen could only stand in a sort of bewildered rage and wonder why a rather common little *contrétemps* like loose dogs should so suddenly make maniacs out of our drivers.

I took a walk around the iceberg for my health.

The funny part of it was that everything was so mixed up and noisy and dark and cold and infuriating that not until I confessed next morning did my white companions know the truth. Truly *pibloktoq* could cover much.

I have no record of how many days it took us to reach Cape Holm. This is the famous Devil's Thumb of old explorers. Glaciers have carved away four sides of a precipitous cliff, leaving a typical "horn" boring 6000 feet into the violet dawn of arctic springtime. Actually it is an island, though so close to the cape that it seems one with it. No better landmark exists on the long unlighted coast. One march south of the Thumb we had covered more than 250 miles all told since leaving the ship, and reached the northern limits of Danish territory. A wooden house constituted our welcome. It was 9 feet square and buried in snow. We excavated around the 2-foot door and entered. It proved to be a little shack built by Knud Rasmussen, the famous Danish explorer, when his ship had been wrecked at this point. But to have a roof instead of the slatting tent, to have a floor instead of the cold, salt, sea ice, was a luxury like nothing I have known since.

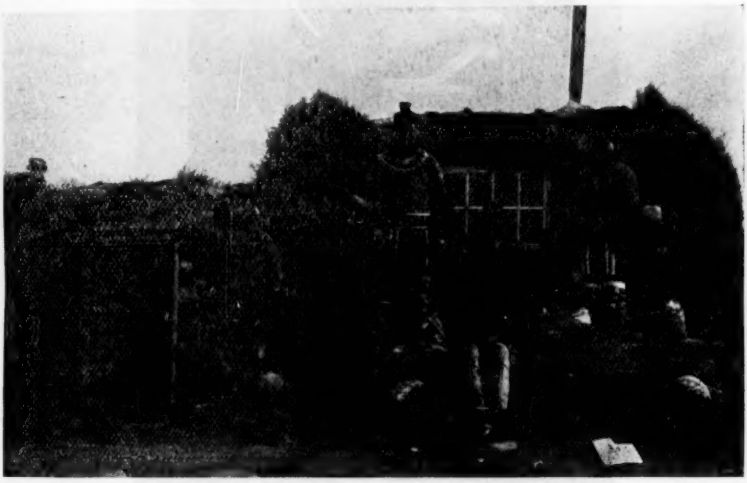
To celebrate we used two candles at once. And we wasted oil to make a "double" pemmican stew—it makes my mouth water to remember. We sang, and we dried our mittens; and I wrote a poem about February tenting in polar darkness which was a masterpiece of blankety-blank verse. When I translated it into Eskimo Toiteaq laughed so hard that he became hysterical. As he was on the verge of having another fit we jammed him into his sleeping bag. There wasn't room for any such carrying on in that hovel.

About 40 miles south of the "hotel," as we called Rasmussen's shack, we stumbled on Etusalik, the first South Greenland village. There were about six igloos and 40 Eskimos, but all so different from what we were accustomed to that we could only stand about and gape.

Everything in the world is relative. There is no such human thing as the absolute. Our Cape York men openly scorned these southern Eskimos, who, though less capable in many ways, are perfectly adapted to their environment. They cannot build snow houses or real rock igloos—have lost the art these four generations. Lumber can be purchased from southern trading stations,

and sod-covered rock walls protect the outside of their wooden huts. They know not how to fashion soap-stone lamps, for the simple reason that the nearest missionary supplies excellent iron kettles. They wear sealskin breeches which are neither handsome nor warm, and sell their bearskins to the traders. With the profits they can buy guns and ammunition. On the whole, though, they are in many ways inferior to men who must, like our own friends, face northern life with no help from the outside world.

Reverse the point of view. Our little tribe knows no chief, no laws, nothing whatever in the way of man-made systems. Native school boys at southern settlements are taught about the



SOUTH GREENLAND NATIVE DWELLING, IN SUMMERTIME, WITH WOODEN DOORS AND GLASS WINDOWS AT WHICH OUR NORTHERN MEN MARVELED

"savages who live in that terrible land beyond the Devil's Thumb"—itself a signpost of dreadful import—"who breed among themselves like dogs. Look you, they worship strange, uncouth spirits, and have no pastor (missionary); whose medicine men destroy unbelievers, chanting ruthless threats against any who would object; whose long hair, large mouths and thick bodies, mark a wild, untutored race. Their strength and courage are those of the beast, unreasoning, instinctive. Who indeed could but pity them in their isolated ignorance?"

Tanq and Allen put up with Itué, the aged chief of their district. He insisted that I lodge with his son Peleq, who, he

averred, was "wealthier and wiser than his poor old father." With pride he went on to tell us of his son's ability; how he had brought in 71 seals after a single day's hunt; how he slew a bear in a single combat and armed only with a knife; and how, despite his valiant achievements in every field an Innuit may enter, in spite of the great fame men had bestowed upon him, he yet forbore to strike his wife in anger. I think there is a moral in his conduct.

SOUTH GREENLAND WOMAN. BEADS MEAN THAT SHE IS UNMARRIED. BOOTS AND PANTS ARE OF SEALSKIN

To Toiteaq the chief introduced himself by, "I am Itué. Surely you have heard of me." The hardy northerner's reply convulsed us. "Not yet," he said slowly; "but do not grieve, for my ears are very small." To meet such servile conceit with calm dignity and humor was more than one would expect of Toiteaq. Yet this ethical poise, as I might term it, was characteristic of the tribe. I have seen them again and again face the deepest mortification, and even death, with the same cool diffidence. And it is even more remarkable when one appreciates the childish simplicity and impulsiveness of their nature.

The men faced one another in the gray dusk; Toiteaq a virile, upstanding savage, and Itué, though softened by his crude sort of culture, yet a good match in the cunning that white man's craft can give. Both were human. Itué went over every loop and toggle of the Cape York sledge. For seasons here permit months

TYPICAL SOUTH GREENLAND WOMAN, SHOWING UNUSUAL DECORATIVE SKILL OF COLONIES FURTHEST SOUTH AND MOST CIVILIZED

of open-water work, while in Smith Sound we had practically a full year of sledging.

The old one admired Toiteaq's thick bearskin breeches and costly fox-skin *kapitahs*—both garments denied to the South Greenlanders, for Danish law compels them to trade in all hides of commercial value. Our young hunter gazed with naive desire

and wonder upon the marvellously decorated womenfolks. To be sure the Smith Sound dwellers have a kind of design in the arrangement of skins for each garment; but the figures are more like a religious litany, full of deep meaning and unchanging through many generations. Some shading, such as on the sealskin shirts, is sewn to imitate the seal itself, so that in stalking a man may easily deceive his prey. But civilization has brought vanity in its train; and already from Etusalik to Cape Farewell men and women vie for looks as much as for skill—ignoring the fact that fundamentally it is skill to kill that counts when famine comes..

Said Itué later: "Who would not desire to go out into the most wintry desert, unafraid, when this slender knife for cutting snow (*peeuktutakin*) stands for warmth and protection?" To which Pingasut made reply: "True enough. But how magnificent thy high roof is, this table of wood, that stool and thin windows clear as fresh ice (glass). See thou hast a multitude of ornaments, while even my great father had but a scrubbed white sealskin upon which to feast his eyes."

Nor is the only dividing line at Cape Holm. The material culture of Cape York is separated from that of Etusalik by no wider chasm than that between Etusalik and the next settlement, Tasiusak; and again between this place and Upernivik beyond. Calik of Tasiusak looked on Itué as a "northern barbarian," yet the same Calik at Upernivik stood out boldly against a background of poorly clad, inefficient hunters among whom the bear kill was more legendary than real, and such a thing as abundance of anything quite out of reach of common man.

These contrasts are, of course, geographically produced. I dilate upon them because we who travel must learn to distinguish not only among the black and the brown, but among the white, just how much of a man is *man,* and how much is climate. On our journey south, cultural demarcation was sharply defined. However, the further south we got the more gradual was the contrast. The change in culture seemed to vary with change in climate, which limited the time possible for various native occupations. Mathematically, if cold and darkness can be so expressed, I should say a man's outdoor ability in Greenland is proportional to the square of his distance north of the arctic circle. South of the circle, boating brings in too many new factors.

This digression is not literary. Actually we were all this time waiting in the cold outdoors. A fiendish custom it is, from one end of Greenland to the other, to make the weary, shivering traveller stand about outside, solemnly conversing with the men, while foolish, frantic wives shuffle the igloos' contents into semblance of order. Such treasures as old, discolored prints, a rusty tool set, a few cracked cups and perhaps the scandalized bust of Denmark's late king, are snatched from their hiding places and hung about.

At last Itué received some sort of signal. "But why," he interposed as if in truth, "should we waste time here in the snow when yonder waits the warm igloo and tea for all?" We had never got used to the habit. "Hang it all!" exclaimed Tanq. "The old fool knew his igloo wasn't ready. Why doesn't he come right out with it instead of lying . . . . ?" But Itué would not permit tired guests to quarrel, and tactfully separated us into our respective lodgings.

The house was mostly underground. Walls were of wood backed by stone and sod, and the whole so drifted over that only the little front window showed through the snow. We entered by a low passage way, which slanted gently upward in order to prevent ingress of cold air.

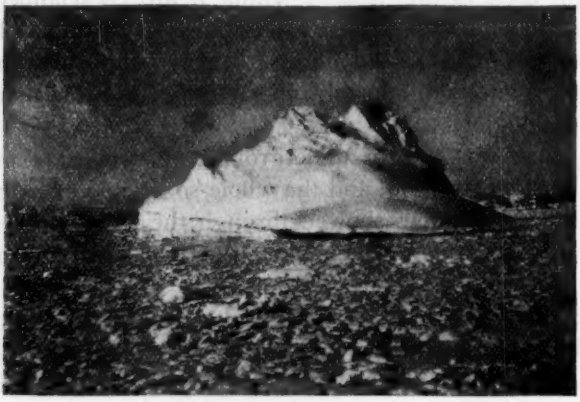
On reaching the interior my senses received two shocks: First, the brilliance. Four lamps were burning brightly, and the white pine walls threw back the yellow light with almost the radiance of sunshine. Secondly, the smell. Oil and meat of every kind and degree of decay I was used to. But the strong, ammoniacal fumes of the South Greenland curing tubs nearly knocked me flat. All skins are cured in these vessels. The whole coast smells of them. Even the food seems saturated with their rank odor. Hardened as we were to filth and animal existence, there was nothing on the clean coast north that could equal this choking odor.

While we ate boiled seal and drank tea, I questioned our host about the various resources of his neighborhood, ice conditions, game and possibilities for summer work with ship hereabouts.

At every place we visited I gathered all such information as I thought might some day guide a mariner patrolling in these waters during the open months. Later, in the weeks I spent at Disco, I compiled all my data and compared it with the inspector's official archives, not only for my own purposes but as a check on his records. In most cases our figures agreed. But once or twice I

found him sadly out, as you shall see. But that first night, on the threshold of a new country, I learned more in an hour than afterwards I could in days. Truly Peleq was a gifted speaker even if he did "cover his legs with the skin of a seal."

Early the next morning, February 7, we travelled 60 miles through the innumerable island fiords to Taisusak (the place of the little lake). Even our travel had become different now, and our best men from Cape York not quite so well able to cope with local difficulties as the guides we hired. From the map one may get some idea of the broken nature of this portion of the coast. Heavy



ICE WORN THIN BY TIDE, WHICH IS THE MOST DANGEROUS FOR SLEDGING

tides sweep in and out among the islands, wearing away the under sides of the floes, until even the thickest mid-winter ice is treacherously spotted with areas but a few inches thick. Time after time we crashed through, and once I had my whole team struggling in the icy water. The thermometer hung at minus 50 degrees, and we thanked our lucky stars for the good waterproof boots we wore.

We realized how far south we had come when the sun showed for a short while above the horizon, and when, a few hours later, darkness fell again we thought we could notice that the North Star dipped a little toward the pole. For nearly three years it had seemed directly overhead, a kind of fatal point under which we were cruelly pinned forever.

Beauty of the calm, moonlit evening was lost in our anxious study of the trail ahead. Any minute sledge and all might go through. And even with the guides, one's dogs were disposed to wander at times from the beaten path.

The long march finally ended. We had then our first experience with a real South Greenland welcome. Scores of men and women and children had heard our whips and dogs, and came running miles out to welcome us. They piled on the sledges, chattered and laughed, and gave vent to happiness which such a break in their sad monotony can mean. Language was a little different, but we managed to swap the news from Etusalik for information which concerned our future movements. Then we met Nielsen.

Nielsen was the trader. His station was the most northerly on the coast, and, in other ways, even more remarkable. His pomposity and general air of rosy blondness made him a type fit for Franz Hals. His native wife is still a native in costume and custom. And his offspring—two sons and two daughters—follow Mendel's law, leaving absolutely nothing to imagination. Hans, the oldest, is so obviously the "a-b" type that I could not take my eyes off the curious admixture of his countenance. Danish and Eskimo races are marvellously distant species of the genus.

"Gentlemen," said Nielsen—his words had to be translated for me—"my cabin is at your disposal. Here," leading us into a small outhouse, "you may strip and pick your shirts. A coal stove shall keep you warm. Through this door is a kitchen where my wife and daughter already boil meat and bake for your empty innards. Beyond that is our parlor where you may spread your skins and bags, and sleep into the middle of next month. And only then shall you awake because my boy Hans must get at his new harpoon lines which are stowed under the floor, on which you shall lie and dream about *Amerika*."

Having delivered himself of this speech with appropriate gestures, he left us. We stripped and picked as he had bid. Also we cut each other's hair. Mine almost reached my shoulders. I had let it grow on purpose to protect my nose, Eskimo style. To ward off the worst pangs a dish of seal meat was passed into us.

From that moment life took on a new aspect. No longer were we to go indefinitely unbathed. Several times a week we could eat at a table, and eat not only with our perpetually present knife

and cup, but with other useful tools such as fork and spoon and plates. Though our diet was always preëminently meat, now we had an occasional taste of flour or meal and some sweetening. No doubt the change did us good.

My notes say, "we dried our soaking *kamiks* and *kooletars*. We filled our bellies with food cooked white man's style, so welcome after boiled or frozen rotten meat. We played the organ, sang and were hosts at a dance attended by the village *en masse*. We rid ourselves of the hordes that had tortured us; had our shirts boiled, and, in fact, took a long step toward civilization."

I thank heaven now we didn't know how much trouble and hardship lay ahead of us. In our innocence we believed that the rest would be easy—even to forget. It wasn't.

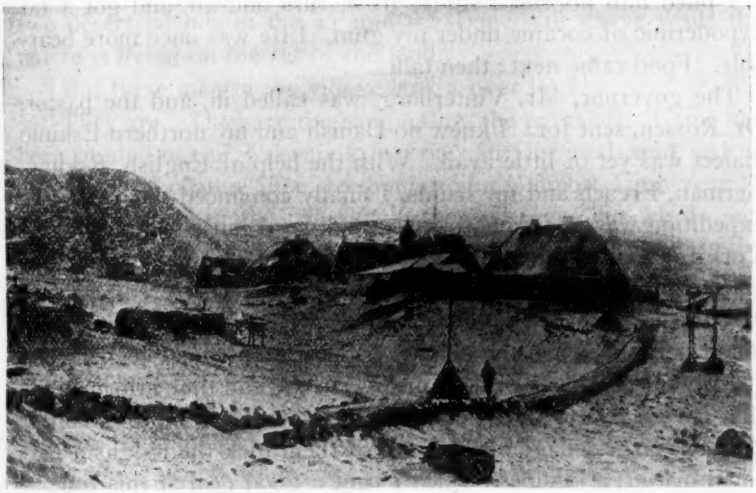
Ever since September I had been suffering from toothache. Although my front teeth had cracked from the extreme cold none were in bad shape. Dr. Hunt seemed to think the trouble a form of acute neuritis. I speak of it because I have seen sailors aboard ship suffer in the same way. Sharp, shooting pains radiate from one or two teeth and spread up into temples and forehead. One naturally concludes the tooth is at fault, and if possible has it pulled. Whereupon the beastly pain transfers its allegiance to the next tooth; and so on. Many of the Danes, some Eskimos, and at least two of our party, were afflicted with the same torment.

We had intended to spend several days with Nielsen, but my tooth grew worse. On February 9 I went ahead, leaving the others to follow next day, or as soon as dogs were in shape. At Upernivik I could find a doctor and a pastor. Between the two, I figured, I ought to get some sort of comfort.

The distance was 40 miles and took over 12 hours of tedious, winding travel. Routes have been laid out and measured by Danish agents so that officials may pay set rates when special drivers or hunters are required. We had no schedule until later. Neither did we have any money. So I soon found that my letter of credit had become more of a menace than a help. Every stop involved me in a score of wrangles over dog food—we had nearly 100 dogs with us—man food, and various other supplies and help.

We reached Upernivik about 9 p. m. As usual the whole village turned out to meet us. For nearly three years I had not seen more than 50 people together at any one time. Consequently when nearly 250 men and women and children, and what seemed like several

thousand dogs, gathered around us in the pale moonlight I felt as if all the people in the world were there. I was overcome by the noise of so many voices. The mob pressed in on my team. Even the sturdy King shrank back in a kind of embarrassed fear. For once I understood perfectly how he felt. I knelt and put my arms about his thick shoulders. Never before had he been caressed; scarcely a kind word had he known in his short and bloody life. Yet he, too, must have felt in me a comfortable nearness. He sniffed in quick appreciation, with his nose under my chin—then



UPERNIVIK IN MAY. ALL EUROPEAN HOUSES ARE AT ONE END OF THE TOWN, AS SHOWN IN PICTURE

sprang like a lightning flash upon a strange dog which had sneaked in by the Queen's side.

Instantly the fight was on. Some boy had loosened my traces in order to hitch the team. All 12 were loose. The village gang closed in. But they were thin and ill-fed like most of their masters. My northern wolf pack had fought bears and musk-ox and other wolves through all their years. Fighting was their outdoor sport. Second only to meat was the feverish joy of "slash him—down him—eat him." They had run 40 miles this day and were hungry. All had been in the water at least once. The way they cleaned up that sneaking band of canine thugs made me forget even my toothache.

But pain soon came a-roaring, and just as a European crowded through the massed natives. His fair skin shone in the pale moonlight. "I am Dr. Bryder," he said in broken English. "The men report that you are shipwrecked Americans. Is eet so? And why?"

"It's so, all right," I replied, perhaps not quite so politely as I should have. "But there's something a lot more interesting than shipwreck—and I've got it right here in my jaw."

"Ah, eet is the tooth-pain. Come queekly and we shall shoot eet weeth my little gun."

I piled into his small study, frost, furs and all, and got a fat hypodermic of cocaine under my gum. Life was once more bearable. Food came next; then talk.

The governor, Mr. Vinterborg, was called in, and the pastor, Dr. Rossen, sent for. I knew no Danish and my northern Eskimo dialect was yet of little avail. With the help of English, Eskimo, German, French and my hands, I finally convinced them that the expedition was in serious trouble, and word must be got to New York for a relief ship. I confessed that I had no money, but was able to produce what I had considered a letter of credit written in Danish. I never found out exactly what that letter contained, but it certainly gave the council enough amusement to make up for any financial loss I might mean. In the end they informed me that I would be advanced enough cash to carry us on to Umanak, the next large village. The three of them took the risk as a personal matter, a kindness which meant a good deal at this time.

Their last war news had put Denmark in the position, as the pastor put it, of a "louse between two nails." That was the September previous. By next summer no home country might be left, and Greenland must perhaps shift for herself.

"You see," said Dr. Bryder next day when his English had got loosened up a bit, "we Danes can live on native fare well enough. But we cannot buy it unless we have something to sell. Trading material comes each August in the little freight ships. Already we are conserving our most valuable articles in case we should be left for two or three years without aid. In 1807 the colonies were seven years cut off from the world by just such a war as this."

"How about your own hunting?" I inquired. The doctor was tall and wiry, and looked well capable of taking care of a team.

He shrugged his shoulders. "Not until you have been a governmental agent will you truly understand monopoly. The Danes hold the whip hand so far as knives, rifles, ammunition, lumber and cloth are concerned. These things are essential to the Eskimo's comfort, but not yet to his life. Very easily he can turn aside from the two generations of training we have given him and become a savage again. We white men, though, have never learned the rudiments of arctic independence. We can drive trained and well-fed dogs; we can shoot and kayak, and some of us are expert with the harpoon. But put a Dane and an Eskimo on two desert islands in the ice and the Dane will starve while the native is living on the fat of the land."

"But these men in the village look a poor lot."

"They are. They are the hangers-on, the parasites. Game has been hunted out of Upernivik harbor. In fact, seals and walrus and narwhal change their feeding grounds almost from year to year. The best of the tribe know these changes but we do not. And we never shall. To keep the white man in ignorance is the native's only defense against total slavery. I have been in both English and German colonies and found this always to be the case, that unless you would enslave the native you must concede to him a superior knowledge of the country and its possiblities—a knowledge passed down from father to son since the tribe began."

I saw the truth. No matter how strong, how rich, how crafty, white rulers may be, they are at the mercy of the natives until they fully and finally take over the responsibility of making a country produce enough not only to feed its inhabitants but also to fulfill the profit expected by the investing government.

Conversely the point is even stronger. When we, the United States, or any other power, take up the sovereignty of a people, either we must give freedom to their indigenous value, that is, to their special ability to develop their own industries, or we must conscientiously assume these obligations ourselves. And later, in hard years or in terms of maladministration, we cannot justly blame the race whose superiors we have claimed to be. As Dr. Bryder concluded: "Suppose we did hunt, and hunt well, for years. And suppose suddenly the walrus disappeared. Would we be capable of trusting instinct for finding them again? No. Because our walrus-finding intuition would be the barest tyro compared to the Eskimo's age-old ingrained knowledge."

He later gave me a good example of what he meant by taking over the development of a country. Lack of game, it has been proven, is practically never the result of less game. Either hunting or climatic conditions have forced the animals to seek new waters. With this in mind a young Dane planned to organize a complete chain of hunting stations along the coast. Migration of game could then be checked and reported, and migration of hunters brought in corresponding strength. No doubt the system would have been successful and would have netted large profits to the company. But by the cut and dried nature of his scheme all native initiative must suffer. And this was the very thing the Danes wished to foster. A slow and scientific maturity for the Eskimo race is put ahead of all financial gain. And, I must say, the Danes stick pretty well to their ideas in spite of their thrift.

The remainder of our party came in on the 12th. Their reception exceeded even mine. A dance was organized and on the next night came off. I say organized because a committee must canvass the village for money to buy candles and dried figs. Each igloo contributes its share of one or two öre, equal to about ¼ of a cent. At least a dozen candles are procured and distributed about the schoolhouse wall. Upon the length of the candles depends the duration of the dance. When the affair is particularly successful it is permissible to douse all but two candles in order to prolong the evening. Less than two is prohibited by the missionary as an "immoral proceeding." After the first hour of our ball I noticed we had but a single pair of candles; and these were "retarded" by bits of frost scraped off the wall.

To visualize a South Greenland dance you must imagine a small, barn-shaped structure crouching under the lee of a granite ledge. Overhead swings a great round moon which touches the cliffs and glacier with a yellowish grey light softened by the whirling snow eddies.

You enter by the inevitable long, low vestibule, and find yourself in a small, barn-like room. Candles at the corners are the only light except for a small native blubber lamp at each end. Backed up against the wall are two rows of figures. Unless you know the long ***kamiks*** and shoulder beads of the women they will all look alike. Men have long hair, and are small. Women are no smaller, and wear the same sealskin breeches as do their husbands and brothers.

On a bench, or oil cask, sits the orchestra. He plays the national air on the national instrument—" O Susannah " on an accordion. This is an English adaptation of the old Norwegian whaling song. Incidentally, the *Texas* has parodied the melody into a ship's song: " Come on *Texas.*"

Suddenly the player stops and blows on his fingers; another takes his place. It is 40 degrees below zero outside, and not much above that inside—though it will be when things begin to warm up. Which they soon do. Allen takes a partner; Tanq and I follow. It's the old-fashioned, sea-going spin we do—round and round till one's head is ready to come off. The *kablunatsuit* (white men) under way, Eskimos follow with a whoop. About every hour or so dried figs are served out. Just why I do not know. The Eskimos think they are great stuff. But such hard and tasteless fodder I never ate. Even our dog biscuit were better. The governor told me tons of these figs are shipped up each year. I suppose they are cheap, harmless and, above all, a little sweet, a quality that makes them good trading material. As a grand climax one cigar is served out to each man, boy and wife. The unmarried girls got no cigar. A mean penalty, I call it, to put on maidenhood. However, when I tasted the cigars I was forced to admit that they might ruin a stronger constitution than a young lady's. The Danish West Indies supply tobacco at ridiculous rates—10 cents a hundred for the cigars in question. After the cigars, we danced some more. In fact the music never ceased, another man stepping up the moment one got too cold to play. About breakfast time we returned to our headquarters, boiled up some ptarmigan, and turned in, just as tired as if we had been sledging all night.

All races have their games. The more primitive the race the more natural the game. Until finally we get back to the original man-animal that played as other creatures do, as babies and children do—for the physical exercise of its muscles. Civilization makes play artificial and over-refined. When an uncultured people are growing, as in Greenland, nothing can be more harmful than to discourage their native recreations. They have not always danced. Even now their igloos are far too small. But the little Danish school cabins permit parties like ours, which are little more than an intensification of the tag, the races and the other games an Eskimo learns as a child. If anything, the dancing is even better exercise.

So I make another maxim for you future naval governors: *Guard the country's games.*

Dr. Bryder found me still in my little bunk when he arrived that afternoon. "Been up the fiord," he blared in the husky croak one gets after a hard day with the dogs. "Had to go over the glacier for a native. Heard he ripped his forearm open 6 inches with a knife. Wife sewed it up, and he was out after seals when I got there."

He kicked off the smoking *kamiks* and wrapped his swollen feet in a blanket. "Queer country this is. Gets queerer all the time. Wait till you have been here awhile."

I opened up with something about the centuries since I had seen Broadway.

"Not that. We are homesick too. No, nothing like the Cape York country either. It's the whole thing I mean—all Greenland. Look at the size of it—512,000 square miles! Why, you could pretty nearly lose Europe in this desert. It's 1500 miles from tip to tip, and 700 broad. But what a sight! It's embalmed, put in cold storage, buried in ice like a giant oyster. Here's Sanderson's Hope across the bay, 3000 feet straight up into the sky. Umanak country a little further south is over 6000. And they go higher inland too. But what's the use? They just go out of sight under the ice. You know the Ice-Cap: one great, blue-white dome. Have you been up there?"

"Sure; we took it on every trip out of Etah."

"Didn't it get your nerve? I mean wasn't there something in its vastness, its pitiless cold weight on the helpless land beneath, that frightened you? I've got so I won't go up there at all. No wonder these brownies say it is full of devils."

He took the tub of tea an Eskimo woman brought and filled our two mugs, then went on.

"The land is little better. Just this narrow fringe, all islands and fiords, with cliffs and glaciers thrown about like the ruins of Pompeii, only here the lava's white. According to the map it's but a few thousand square miles of bare rock except where the snow doesn't go. In that space we've got about 12,000 Eskimos to handle, half in each West Greenland inspectorate, but not over 600 on the east coast."

"What does that mean?" I put in.

"Well, in the first place, Denmark finally realized that old Hans Egede, way back in 1721, was right when he said his missionary station would pay, and she closed up the country. That was about 40 years ago. Administration was put into the hands of a Greenland commission at Copenhagen, with a director appointed by the Crown. His job includes choice of two inspectors for running North and South Greenland, as we call them. The dividing line lies between Holstenborg and Egedesminde. This happens to halve the population as well; though that is not the real factor in choosing the line."

He took down from the wall his big government chart which, by the way, has been made confidential.

"See how Disco Bay breaks the coast? Inside is the heavy glacier. Outside the island both north and south tides can sweep westward from the bay. Then currents carry the pack out. Whaler's call it the "South Water," and used to count on it to get them to Disco in the early spring."

He turned, with a new look on his face. "Remember this, Lieutenant, the Germans may get here." (The war zone now extends to Upernivik.) "You will, too, some day. The outer harbor at the settlement (Godhaven) is open as early as March 1, and stays so sometimes until after Christmas. There's coal in the back fiords (the Waigat). And there's an abundance of provisions in the trader's storehouse. You can make it in a good day from Cape Farewell. You can leave it loaded to the 'gunnels' with all the destroyer needs—even oil."

I wondered how much he was stretching the story. "Is the coal a decent sort?" I asked.

"I'll tell you the truth. So far it's a good deal lignite. About the same as I hear you get in Alaska. But it is growing better all the time. More easily mined and higher grade coal. And, a little secret," he lowered his voice as if he'd forgot there was only the wilderness and the driving snow to eavesdrop, "there's more than coal."

"Gold, is it?" I laughed. He was almost too serious, standing there, tall, cadaverous, and with a feverish brightness in his eye, as if it were his dreams he was letting me see for the moment.

Not an eyelash flickered. "Almost," he said. "Better, maybe—for is it not better than gold itself to have what the world has not? Graphite for one; and—"

He didn't finish. The governor threw open the door. His glance caught the two of us and the map between. In Danish he spoke to the doctor who laughed. "Wants to know if I'm giving away our naval secrets," said he.

The governor spoke again. Dr. Bryder nodded.

"He wishes me to explain to you," continued my host, "how securely Greenland is closed, and the reasons therefor. Shipwrecked explorers are about the only people who can tour this country. Even Danish scientists must have passports, which are more difficult to obtain every year. Ships call sometimes, but no one is allowed to land. We forbade Peary to come ashore in 1886. We head off fishermen and whalers every year."

"But you told me I'd get in with my destroyer," I interrupted.

"Ah, but there you are your government's representative in a vessel of war. You would receive every courtesy and unlimited credit. But if you were a writer, or a trader, or even a wealthy traveller, our laws would compel us to send you away."

"What's the idea of all this seclusion?"

"Threefold. First, the people. Look at your Alaskan Eskimo, rotten with disease; starving; hideous with tuberculosis and filth; far better dead than alive. Remember your Oregon Indian tribe that disappeared in a few weeks with smallpox. Picture the horrors of Labrador Eskimos—not one in a thousand uninfected by the virulent poisons of three generations of sealers and of unscrupulous traders. I could bring up Hawaiians and Samoans but the comparison, though pungent enough, would hardly be fair.

"Now take the other extreme—your Smith Sound Eskimos. Out of the whole 200 in the tribe were there any really unhappy, or diseased, or crippled, or starving? From what I've heard, *not one*. Why? Their country is closed—closed by God Almighty, and closed so almighty tight that it takes a Peary to get in! But look at the result: A tribe of men and women and children that must make God Almighty glad He shut them out of the sinful world even if He had to put them into a refrigerator for fear they wouldn't keep!

"Our second reason is trade. The chief products are seals, walrus, narwhal and fish oil, skins and the minerals from our several mines. Oil runs over 15,000 tons a year, and you know what it is worth these days. We sometimes get 5000 fox skins.

Did you ever price one? American millionaires buy most of them. Then come some 4000 tons of salt salmon and halibut, 25,000 sealskins, 3000 walrus hides—I'm giving you average years—and I don't know how many thousand bales of eider down, bird skins and feathers. Narwhal and walrus ivory, and whale-bone make big profit some years. Depends a good deal upon the market.

"By eliminating competition we not only keep prices down and profits up, but we are able to do so without harming the natives. We can govern their luxuries and regulate their necessities. We can reward the good hunters without penalizing the poor ones. By careful comparison of the various districts we insure that no settlement or section becomes wealthier than the others. We control the currency, which is paper money made for the colonies. There's no banking necessary. We encourage the natives to save, and pay them 5 per cent on their capital."

I stopped him. "You mean to say you pay them paper money and get it back for only 5 per cent?"

"Exactly. Except, of course, the little they spend on shop goods, sugar, figs, cloth, etc., and we make a profit on all of that."

It seemed incredible. "Then, theoretically," I paraphrased, "you buy a bearskin for 20 *kroner*. The Eskimo returns the 20 *kroner* for safekeeping at 5 per cent or one *kroner* a year interest. If you didn't have to pay back the 20 *kroner* you would really be buying on the installment plan, 20 payments to settle."

"Very true," continued the doctor; "and happily enough the original investment is seldom called for. An Eskimo must pay his taxes, contribute to church and school, and support a council, until in the end his total wealth stays about where it was in the beginning."

"Pretty soft for you people," I couldn't help saying. But the Dane only smiled.

"That's your American point of view. Wait till I finish. I said we had three reasons for locking the colonies' doors. First was the people, second the trade. Third, and in many ways most important, is the *country*, the island continent of Greenland as a whole.

"Suppose you were a skillful chemist. In the course of your research a rare salt suddenly appears on your watch glass. The technical world covets the analysis of this bit of precious residue. It might revolutionize industries, cheapen living and bring happi-

ness to thousands. A few hours' labor on your part could sift the facts from the powder.

"But you quake with greed. You know the terrible truth; a bit of acid, a drop of solvent, heat, dilute—and the passive isomeride is made. It's worth millions. *You're* worth millions now; but at what a cost! You've sold the chance to make men happy for the gold that makes them unhappy—which will make even *you* unhappy."

I couldn't see what he was driving at, but I sat tight.

"Take any colony in the world—even Greenland before we started to reform her. The Sovereign State is a skillful legal scientist compared to the rude barbarism suddenly precipitated upon her slate. Let her drop the acid of slave-driving among the men, dissolve their happy homes by fomenting dissension in the peaceful community, fire the countryside with hatred for injustice and knavery, finally dilute the race's innate powers with all the dregs of low white blood—and the passive isomeride is made. It's worth millions. All modern colonies—except Greenland—are worth millions to their Sovereign State. *The Sovereign State* is worth millions now. But at what a cost! She has sold the chance to make men happy for the gold that makes them unhappy—which will make even the *Sovereign State* unhappy."

I began to sit up and take notice.

"Denmark isn't really making a cent out of these colonies," he almost shouted.

This contradicted what he'd said before, and I plainly told him so.

"Put it this way then," he replied patiently. "Say we net half a million *kroner* a year from the colony, counting exports, trading material, financial manipulation and so forth. That sum goes right back into the country. Our anthropologists are studying the race. Our ethnologists are specializing in Eskimo culture. We have the greatest modern linguist tracing and analyzing the native tongue. Our geologists and mineralogists, together with several American mining experts, are scouring the coast for future mining sites. Expeditions to and across the inland ice have been organized and executed. Long and costly experiments have been made to determine the cheapest and most efficient method for doing nearly everything an Eskimo does. The scientific stations and laboratories at Godhaven are a constant drain upon

the colonies' exchequer. The seminary at Godthaab takes the best boys along the coast, but certain chosen ones are sent to the University of Copenhagen at the government's expense.

"Have you ever seen a copy of the Meddelelser on Greenland? It's the printed record of Danish research in Greenland. Though it already includes a score of volumes it is far from finished. It's a monument of industry, patience, learning and generous effort. To be sure, we are all strengthening the people and insuring future prosperity in the land. But we are doing even more—we are dissecting the last truly primitive race on the earth's surface; and we are preserving in enduring form, for the benefit of future civilization, the fact that *stone-age man was happier than gold-age man, and the reasons therefor in detail.*"

He rose and stretched. "Perhaps I'm too enthusiastic," he yawned. "But you're going through the colonies now. It'll be a hard trip physically. I've done it and know. A thousand miles of glacier, ice cap, cliffs, mountains, and not much food in between. But you'll remember the things I have told you, and the very interest of the trip will dull its petty hardships and discomforts."

He turned in. I turned out. Tanq and Allen turned up. The governor, they informed me, had arranged for us to leave that next morning. Mail going, I believe, to the next little village 20 miles south.

I wished to stay and talk longer with the patriotic doctor. He had set me thinking. He had thrown new light on my ideas of the country. He had made me realize how wonderfully fortunate I was, after all, to be here behind the scenes of this little drama of geographical development of which the outside world knows almost nothing. It gave my journey a professional value, a naval value—as I shall presently show.

The governor advanced me a sum of money which enabled me to engage new guides. I held on to Pingasut and Egingwaq, the two Cape York men, as they were dependable. South Greenlanders are not accustomed to long trips. Almost never do they sleep out. With our own boys I felt we could make the trip alone, if necessary, though it would take double the time.

We left early and picked our way among the leads and thin spots for a good many hours. I was delayed, at the last minute, by having to settle up our accounts with Mr. Vinterborg. Most

of the day I and two others were behind. Several times we broke through tide-thinned ice, and every little while were forced up over the land.

We still had only a few hours of sunlight, and darkness shut down early. The waning moon helped little. But with a guide just ahead I had no great difficulty in following the trail. The dogs were more lively than they had been for some days.

I should have been thoroughly contented had not my tooth suddenly started off again. The pain aggravated me into impatience with the end dog who persisted in starting for a seal-hole that had come within smelling distance. Suddenly the whole team started off. They dashed out almost at right angles from our course. Before I could stop them I was out of sight among some low bergs frozen in the pack.

Shouting at the dogs redoubled my toothache. It also served only to excite the dogs. Fifteen minutes must have passed away before I mastered the runaways and untangled their traces. I turned back in what I thought was the direction of the trail. The team swerved, all but one dog. He broke through; and in the dusk I could just make him out struggling in the black water.

I drove my killing iron into the ice and anchored the sledge. Another dog was in. Finally I got both of them clear. The team was thoroughly cowed, but I couldn't turn easily for fear of us all crashing through. I climbed atop a small berg. To my dismay I saw a shadowy black line of thin ice running out of sight north and south. I was cut off from land! And the worst was that the first breeze might take the whole field adrift and out to sea. It looked bad.

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

GOEBEN AND *BRESLAU*

By LIEUTENANT (J. G.) S. F. BRYANT, U. S. Navy

In arranging notes on the German battle cruiser *Goeben* and the cruiser *Breslau* two assumptions are made. First, that one can always appreciate a courageous act or duty skillfully done, even by an enemy; second, that it is far more profitable at this time to study the successful moves of our enemy and the reasons therefor than to spend too much time in abhorring his atrocities, and his thorough dismemberment of international law.

The *Goeben* has probably been of more political and material value to the nation she has been fighting for than any ship taking part in this war. In the following pages it is endeavored to show how, by cleverness, diplomacy and force, this German renegade has brought to bear a remarkable influence upon the war and upon Turkish history. The notes have been taken from "Die Farhrten der Goeben und der Breslau" by Emil Ludwig, which appeared in Berlin, 1916, from "Nos Marines a la Guerre" by Commandant Emile Vedel, and from recollections of the writer's duty at Constantinople during the war.

First, let us trace briefly the career of the two ships before war was declared and sum up the evidence of considerate forethought as displayed by the German Admiralty.

MEDITERRANEAN FUGITIVES

The *Goeben* and the *Breslau* were sent to the Mediterranean over a year before war was declared. In May, 1914, the *Goeben* visited Constantinople for the second time and found a timely and profitable occasion for sending some 300 men ashore to extinguish one of the city's periodical fires. The evident devotion displayed at that time for saving Turkish property must have arisen from the gratitude of the Germans at gaining such familiarity with the Straits of the Dardanelles.

The armament of the *Goeben* consisted of ten 11-inch 50-caliber, twelve 6-inch guns, and four torpedo tubes. Whereas this gun power was inferior to that of several of her enemy ships in the Mediterranean, nevertheless, her speed of 28 knots or more was greater than that of any of them. This latter noticeable factor, not fully appreciated by the Allies until too late, enabled her to out-distance her pursuers and engage upon raiding expeditions. The *Breslau* was armed with ten 4.1-inch guns and two torpedo tubes of the same size as the *Goeben* (20-inch). Her speed was nearly the same.

The importance of the rôle that these two ships were to play was further emphasized by the rank of the commander-in-chief which, for one battle cruiser and a small cruiser, was that of vice admiral.

Admiral Suchon was of French extraction and married to an Italian. He possessed a good reputation with Emperor William, was regarded as a veritable corsair, and had a thorough knowledge of the Dardanelles and the tactics of the young Turk party.

At the time of the Serajevo murder, June 28, 1914, the *Goeben* was poking around the Syrian coast. The *Breslau* was in Durazzo watching the Albanian developments. At that time her crew was on such friendly terms with the crew of the British cruiser *Gloucester,* also at Durazzo, that cap ribbons were exchanged during their games. We shall soon find a change in the relationship of the two crews.

Suddenly the *Goeben* was recalled to Pola. After a few weeks' stay there she put out to sea. It was a singular fact that on August 1 the *Goeben* and the *Breslau* and the *General,* a large steamer of the East African Steamship Company, all happened to rendezvous at Messina to take supplies from auxiliaries that were there to meet them. It has been said that the supplies even included a provision of Turkish fezzes. Departure "under sealed orders" was taken from Messina at 1 a. m. after a stay of but six hours.

The Germans received, while at sea, news of the first declaration of war against France at 6 p. m. August 3, while the French did not hear of it until 10 p. m. the same evening. As is customarily described in the German accounts, this news was received aboard the Teuton ships with delirious hilarity. Grave "infractions of German discipline" are recorded. Admiral Suchon was

carried about the decks on the shoulders of his men, and was so moved by the display of enthusiasm that he touchingly reserved for several days the white uniform that had been soiled by the hands of his firemen. Later when the writer visited the *Goeben* and *Breslau* he failed to notice any continuance of this enthusiastic spirit, as most of the officers had an air of depression.

The French Mediterranean fleet had mobilized at Toulon, while the two German ships were at large. The British had at that time two battle cruisers outside Messina, four cruisers and a dozen destroyers between Sicily and Tunis, and three cruisers at Malta.

While still at sea, there came unexpectedly to the German admiral, soon after the war was declared, the order to proceed immediately to Constantinople. But the admiral had planned otherwise. The first morning of the war was to be celebrated by an offensive against enemy territory. Moreover it would be best to deceive his pursuers as much as possible as to his ultimate destination. So he made all speed for the Algerian coast where he arrived just a few hours in advance of the French fleet. Two cities, Bona and Philippeville, were hastily bombarded and the German ships disappeared in the direction of Gibraltar.

The vital question for the French then became, "Where would the Germans seek refuge? Would they make for the Straits of Gibraltar?" There was a German collier in the Balearic Islands that hinted at that direction. Would they make for Pola? The British fleet would watch for them there at least, though they could not sink them, as war had not been declared by England. Again, would they make for Suez? That was hardly probable. The idea of the Dardanelles, then, most unfortunately received no consideration. The German ships were found by the British forces between Tunis and Sardinia. That was just 12 hours before England declared war, and there was nothing to do but pass each other in opposite directions, each force ready to fire after the other did. As for a salute, the time had passed for such politeness. The British attempted to follow but were soon lost in the chase, with the exception of the cruiser *Weymouth*. When darkness set in the German admiral changed course, shook off his last follower and put in for the second time at Messina. At 11 p. m. news came that England had declared war. We are told that there was grave silence among the German crew.

At Messina a cordon of Italian destroyers formed around the German ships to preserve neutrality and remind the belligerents that they could remain but 24 hours, according to international law.

Coal was taken on board with the utmost haste. The crews working by reliefs, and, grimy with coal dust, found temporary rest on the snow-white beds of the *General,* where but a few days before "ladies of means had but commenced their luxurious voyage towards Africa, while dreaming of a tropical elegance."

As the fateful end of the 24 hours was approaching, the admiral was reminded by the Italians that he must leave. But how? With the British battle cruisers waiting for him outside, already beckoning him with false radio messages to join the Austrian fleet! It was a battle without mercy that he faced. A silence of despair was coming over his men. But preparations were made to make the enemy pay dearly. As a last repast, rich dishes and wines were served out to the men from the *General's* stores, inspiring music and patriotic appeals from the captains inflamed the men (with the help of the wine) into a state of vicious courage.

"Outside are two enemy fleets, we are only two, but we will pass! Remember the *Iltis!"* said one captain to his men. The *Iltis* was a torpedo-boat that in 1896 had been thrown ashore in the China seas by a typhoon. Nearly the entire crew was lost.

Then at about five in the evening a radio came to the ships: "His Majesty expects the *Goeben* and the *Breslau* to succeed in breaking through." With colors flying, band playing, and caps waving in the air the cruisers steamed out of the port followed by the *General,* to which a later rendezvous had been assigned. Hardly had the harbor been left before the lookout signaled: "A cruiser ahead to port!" But it was only the little *Gloucester* with two 6-inch guns and ten 4-inch. The Germans were eager to open fire. But the admiral refused to give the order and even refused permission to the radio officer to "jamb" the warning that the *Gloucester* was quickly sending to the British battle cruisers that lay waiting at the Strait of Otranto. Then straight into the jaws of the lion headed the admiral, disobeying orders and risking everything in a last effort to force the passage to Pola.

But, near 10 o'clock off Cape Spartivento he turned suddenly to the south, and filled the air with all the husky irregular vibra-

tions that his radio antenna could force into space. All communications between the *Gloucester* and her commander-in-chief became impossible.

Never to say die, however, the little cruiser gave chase to her foe and at 5000 meters launched a torpedo at the *Breslau* which but narrowly missed its target. Not daring to stop, the German admiral submitted to the chase until the next morning. Then, ordering the *Breslau* to spread a smoke screen, he endeavored to escape under it. The *Gloucester,* however, was quick to attack the *Breslau,* striking her at long range. The *Goeben* turned to the relief of the *Breslau* and the mightly little *Gloucester* had no choice but to retire. One curious detail was that a sister of an officer on the *Gloucester* had but a few weeks before married an officer on the *Breslau.*

Several months later the writer chanced to meet the *Goeben's* executive officer in Constantinople. The commander spoke of some enemy stories told of the escape of the cruisers. One version was to the effect that the running lights were so reversed and dimmed that the enemy outside Messina was led into believing that the prey was heading in the opposite direction. This idea would have been nearly impossible in practice, as the bearing of the lights or the change of bearing would not be affected by shifting the lights on the ships.

Another version described how the band of the *Goeben* in one of the ship's boats proceeded in one direction and the cruisers in another, the enemy of course pursuing the band!

The rumor to the effect that the German admiral, by having the British signal code, ordered the enemy to Malta by a false message was flatly denied by the commander as it always has been by the Germans.

To return to the flight. An imperative necessity soon altered conditions for both sides. It was coal. The Germans could not reach Turkey without refilling their bunkers. A collier, with all due forethought, was waiting at Cape Matapan. But coaling could not be risked in that dangerous vicinity. To make matters worse the radio brought the disconcerting news that the Turks were not disposed to open the Dardanelles for the admiral. Where then to go? Conditions were getting desperate. An unfrequented Greek island named Denusa was selected. The few fishermen living there probably had never heard that war was declared. To

be cautious the names of the ships were covered over with sail cloth and all cap ribbons removed. The coaling then proceeded there with haste, while German diplomacy in Turkey was undergoing a series of frantic efforts to open the Dardanelles for Germany alone. The *General* in the meantime had proceeded to Smyrna, where she could relay radio messages from Constantinople to the *Goeben*.

The British during this time, being just as much in need of coal as the Germans, were coaling at Malta.

As soon as coaling was finished at the Greek island the delay for the Germans becaming agonizing. Each extra moment might be fatal.

The *General* still radioed Ottoman refusals. On the evening of the 9th the admiral decided that the resistance of the Turks must be broken, and sallied forth to force the Straits, Turks or no Turks. To make the situation more desperate, news was received about that time that the British were within four or five hours' steaming distance.

The Germans arrived at the Dardanelles the next evening about 5 p. m. on the 10th, headed into the mouth of the channel and demanded, by signal, a pilot boat. The critical moment of their existence! But a small steamer was there waiting with the signal, "Follow me."

Four hours later the British arrived. But darkness had set in and they were refused entrance. There was the question, not to pass, or to pass at all risks? Nelson, Farragut, or Suffren might have chanced it; but we must remember that they had not in their time—the sometimes enemy to opportunity—the apron string of the radio.

The next morning it was too late. The raiders had occupied the forts, and with the help of accomplices had manned the batteries and were not losing a minute in strengthening the mine defences.

TURKISH RENEGADES

Let us leave the two cruisers for a moment and briefly outline the sentiments of the Turkish cabinet. The control of the Ottoman policy is supposed to be in the power of a secret committee, the members of which are known to but very few individuals. The cabinet members publicly known are but pawns in their hands,

though it is true that two of them, Talaat and Enver, hold a strong hand in the secret committee.

Talaat Bey, Minister of the Interior, when war commenced, had never shown anything but the friendliest attitude towards the Entente. The Grand Vizier, Prince Said Halim, was earnestly against Turkey's entering the war under any conditions. Jemal, Minister of Marine, was openly partial to French and British. In addition, the other cabinet members were well disposed towards the Entente.

Enver Pasha, War Minister, was a German protégé. In days gone by he had recovered Adrianople for Turkey from the Bulgarians. The Germans picked him out after the Turkish Revolution as just the promising, high-handed chauvinist assistant that they most needed in the oriental department of their infernal machine. He was made Turkish military attaché at Berlin. There the spell of the war game, a spell that rivalled that thrown over a Monte Carlo victim, was woven. Enver then returned. Upon the murder of Shevket Pasha, the Minister of War, the young German protégé, still in his thirties, took his place at the head of the Turkish military machine. There are some in Constantinople who believe that Enver had more of a hand in the murder than they dare say out loud. Somewhat short, black-eyed, well-built, determined and alert in mien, yet suave and almost effusive at times in manner. Enver was keenly ambitious, and aspired to be a military leader of history.

A story told of the War Minister may serve to illustrate one side of his character.

The Greek Patriarch, the head of the Greek Church, went to Enver to implore him to ameliorate the sufferings of the Armenians. The curt reply was: "You tend to your prayers, and I'll tend to the Armenians."

Enver was the connecting link between the German and Turkish forces, and one of the principal members of the scheming squad that threw Turkey into the war against her will and against her old friends.

The combination was made up of Baron Wangenhein, General Liman von Saunders, Admiral Suchon and Enver. Baron Wangenhein, the German Ambassador to Turkey, was a man most noted for his ability to drive others into carrying out his designs. Von Saunders was the leading German army officer in Turkey.

who later was put in command at the Dardanelles. Admiral Suchon was introduced by the entrance of the *Goeben*. Here appears the first important link in the chain of events which ruined Turkey and in which the German cruisers played so large a part. The scheme was one that brought forth historical results. The several ramifications were as follows:

1. A campaign of propaganda was inaugurated, maps appeared in the Turkish markets showing how much territory the Turks had lost or had been robbed of since the Balkan League had been formed. Enver Pasha was widely advertised as the hero that had recovered Adrianople from the Bulgarians. The Turks were reminded of the traditional wrongs that Russia had inflicted upon them. It was carefully brought out that England had united with Russia against Turkey. Also, that in the natural course of events Germany was the only power left which was strong enough to aid Turkey. The Kaiser was actually portrayed as the Defender of Islamism, and in some quarters of the interior the natives were informed that he had turned to the Mohammedan faith. He was pointed out as the only man who could save Turkey from Russia. A very important bit of information spread broadcast was that the Moslems of India were about to rebel against their English tyrants, who were slowly destroying the power of Islam. Also that the Egyptians were preparing to throw off the British yoke.

2. The army was expanded into a system under German military control. Newspapers that were not discreetly pro-German were suppressed by the military. Papers subsidized by Teuton money published ridiculous accounts of German achievements. Posts and telegraphs were censored by army officials. Throughout the army hatred was stirred up against the British. In a camp of newly collected troops an official was known to have marched up and down declaring, "England is the enemy, England is the enemy!" Later on a wounded Turkish soldier from Gallipoli exclaimed in a hospital, "The English are coming to destroy our homes, the English are helping Russia, the English are the worst enemy, and the English use dum dum bullets!" The news was also spread in the army that some day the Turks must regain Egypt; that the British were taking Egypt away from them.

3. Promises were lavishly made. The hated "Capitulation," which so degradingly restricted the sovereignty of the nations, would be abolished under German guarantee. Crete would be

restored. Money and plenty of it would be forthcoming from Germany. It was said that there was for this purpose more gold aboard the *Goeben* than in the Imperial Ottoman Bank! (What mattered if Turkey should hopelessly mortgage herself?) Germany would also pledge herself to provide expert advisors for the Turkish governmental departments. As an example, a corps of German professors was sent to "assist" the progress of education (German unmentioned) in the Stamboul University.

4. The Dardanelles were closed and heavily mined. From various reports it was believed that the defences of the Straits were strengthened by littoral torpedo tubes. Two cargoes of munitions then in the Mediterranean were, for safety, despatched to Syria.

5. The Turkish Army was slowly enforced by detachments of German troops, artillery and munitions. A friend discovered by accident, long before war was declared, a considerable and entirely unsuspected force of German soldiers at a Turkish fort not far from Constantinople.

6. Admiral Suchon, by "advisory" work, actually got in practical command of the Turkish Navy. For some reason the Turkish Minister of Marine was put in command of the Syrian forces of troops. The German naval officers were distributed among the Turkish war ships. As the Turkish naval officer is lacking in natural ability and advanced training for the sea, the knowledge of the Germans on each ship became an irresistible tool, and it was not long before the Ottoman Navy was quietly controlled from the German Admiralty headquarters established in the Golden Horn on our old friend the S. S. *General*. One factor that "Fritz" might not have seen the humor in was that all commands on the Turkish ships had to be given in the only language mutually understood, English. Most of the Turkish naval officers had gathered a little English from the Naval Commission of British Officers previously sent to Turkey to aid in building up the Ottoman Navy. As for the Germans, the majority of their naval officers speak English.

7. The crowning piece of strategy lay in the advantageous use that the Germans made of the seizure of two Turkish ships then being built in England. These were the *Reshadié* and *Sultan Osman*, two battleships that would have turned the strength of the Ottoman Navy against that of the Greeks. These ships had

been subscribed for from the savings of the Turkish people. Soon after war began the British refused delivery. Law in this case made no difference. The palpable proof that England was prejudiced against the Turks and would unite with Russia against them was very evident. The Germans made such good use of this point that many Turks really became deeply resentful towards Britain. To cap the climax, the Teutons found a solution that seemed most thoughtful and beneficial to the Turks. If the British could dishonorably rob the Turkish people of their much-hoped-for war ships, the Germans would generously atone for these wrongs by selling them the *Goeben* and the *Breslau*, two ships that were ready to fight any minute. The German-inspired papers spoke of the British move as an act of piracy by a bully against a small state. Here appears the second link (and a most valuable one) that the *Goeben* formed in the chain that fettered Turkey in these last few years of general destruction of human life. The deal was put through and modestly advertised almost everywhere. It was pointed out how easily the fighting strength of the fleet was doubled, and how with great ceremony the "Crescent" had been raised at the flagstaffs and Turkish crews put on board the German ships. As a matter of fact, there were but a handful of Turks allowed on board at all. There were a few officers and some 30 men who never got below the berth deck, and whose mere existence on board abruptly terminated after a few weeks' stay. The German crews, much to their disgust, were ordered to exchange their ribboned caps for fezzes. These hot and brimless head coverings allowed many a merry sunbeam to burn unmercifully the Teutonic proboscides. Moreover, it is not to be presumed that the Germans exchanged their man-o'-war ensigns for the red crescents without a few pangs of smitten pride.

8. But in spite of the intrigues of these four men, Turkey would not put her head in the noose. It, therefore, remained to devise a master stroke. It was strange that the plan then decided upon was carried out in detail just as had been predicted by a German friend a few weeks before. Turkish torpedo-boats under control of German officers on August 29 deliberately opened fire on the Russian port of Odessa. A gunboat was sunk, much damage done, and Russia insulted beyond apology. It was an affair difficult to comprehend from the Russian point of view. It meant war. It was generally believed that the only Minister in the Cabinet that

knew anything of this plan beforehand was Enver Pasha. Here again the German cruisers played their part in furnishing officers to direct the raid.

UNDER THE RED CRESCENT

After the Turks were snagged into the war there were rumors of possible revolution. Again the *Goeben* had its part to play. At one time she anchored in the Bosphorus just off Dolma Bagtché, the Sultan's palace, with her guns trained abeam. It presented the most formidable sight in Turkey. With the *Breslau* she would have been a match for the entire Turkish Navy because of superior speed, trained men, and modern fighting efficiency. She carried ten 11-inch and twelve 6-inch and twelve 24-pounder guns. One of the 11-inch turrets has a loading record below eight seconds. An advantage in action is that in each turret some 16 shells with their powder charges in brass cases can be carried. There are four submerged torpedo tubes. The horsepower is about 85,000 at 28 knots. Each turret is fitted with its own range finder, range transmitters, and substation below the turret. The complement is about 1100 men. All furniture aboard is of steel. Stacks are encased with 6-inch mantlets that extend about 12 feet above the upper deck. There are four screws, two rudders and two steering engines.

Whenever thinking of the sea power of Turkey, one's mind unconsciously turns to the *Goeben*. Throughout all her escapades the Turks came to regard her as the backbone of the Ottoman sea strength. Time and time again she survived long voyages in the Black Sea in the face of a Russian fleet several times her strength. Each return was but another sign to the Turks of the presence of a force that was worsting the Russian. Undoubtedly then her political influence all during the war had considerable effect upon the morale of the population, a factor that was important to foster with care.

To care for such a craft it was necessary to fit out some sort of a base for repairs and supplies. A small cove in the Bosphorus at Stenia, halfway between the Black Sea and Constantinople, was selected. Here works of a French engineering company were seized and made good use of. The inhabitants of the adjoining village, with the exception of a few Turks, were expelled from the neighborhood. There was just room in the tiny harbor for

the *Goeben,* the *Breslau,* the Turkish destroyers that were engaged on patrol work, and two transports serving as more comfortable quarters and receiving ships.

The first work of the Germans lay in the Black Sea. With their superior speed it was most difficult for the Russians to catch them even with larger forces. Coal was vitally needed by Turkey. As her only serviceable mines were on the Black Sea coast and were not connected by railroads with the capital, it became necessary to send ships into the Black Sea. The *Goeben* in many cases convoyed these ships. One of the trips nearly resulted in disaster. The account is as follows:

In the fall of 1914 the battle cruiser was steaming out of the Bosphorus into the Black Sea, heading towards Odessa. All water-tight doors were closed. The officers and men were at their noon-day meal. A sudden terrific explosion on the starboard side forward brought all hands to quarters. But one minute after the explosion there came another on the port side. The ship had picked up a cable connecting two mines. She settled heavily in the water, so low that for a while her officers thought her done for. The ship, however, was able to steam slowly back to Stenia. Engineers and supplies were sent for from Germany for the repairs. The task of patching two rents in the hull that a diver could not reach across was an enormous one. The forward explosion had deformed all the plating from the armor belt down to the docking keel. The injured compartments were provision storerooms. The after rent was outside a coal bunker under number three turret. This turret was said to have been out of commission for some time. One factor that prevented the damage from being more serious was a thick protective deck that acted as a support for vertical bulkheads. Repairs were carried out in some three months' time by means of coffer-dams built around the holes.

The bottoms of the coffer-dams were constructed in the form of tanks. Pump connections to these governed the depth of the coffer-dams. The upper edges of the sides were fitted with tanks that served to keep the coffer-dams vertical. The inside gripping edges of the dams were lined with oakum and canvas. As the water was pumped out the pressure tightened the oakum against the hull. A number of chains secured the coffer-dams in position while the work was in progress. Ship's pumps were used for evacuation.

As far as possible, injured plates were entirely removed by acetylene torches and then replaced.

One handicap in this work was the lack in Turkey of skilled labor and particular appliances.

One interesting item of the work was a diagram that the German engineers had of a similar coffer-dam that was employed by the Russians in effecting repairs after a mine explosion under one of their battleships at Port Arthur. We trust that the Germans had an accurate copy!

There were many current reports that steel plates resembling fish scales in their formation were ineffectually tried out for such hull repairs. Also fillings of cement. The latter, one heard, were subject to cracking from the effects of gun-fire.

At Stenia the Germans made themselves at home. On the hillsides behind the port, a farm was laid out—the "Goeben Scientific Farm." When in port the sailors were put to work upon it. To increase its popularity, the work, during certain days of the week, was converted into a social function, attended by various members of the Germano-Levantine fair sex from the capital.

There were a few other items of interest at Stenia. For precaution against venturesome enemy submarines, booms and nets were rigged at the harbor entrance, and at one time the *Goeben* was surrounded by a string of old schooners.

One of the many doubtful rumors told of a raid made on the *Goeben* by a crowd of angry Turkish women, who objected to their sons getting killed for Germany. It was said that they raised such a row at Stenia that the *Goeben* had to get underway for the sake of peace and lie for a few days in the Marmora. All that was really known was that the cruiser did leave Stenia for the few days.

To illustrate the modest and bashful attitude of the German in Turkey to-day, the following occurrence may be of use. When war was first declared by Turkey, it so happened that the royal yacht of the Khedive of Egypt lay anchored in a part of the Bosphorus not far from Stenia, where the current was rather strong. When a storm arose and the captain tried to get the 3000-ton yacht underway, he found his condensers clogged. As his anchors were dragging, he sent an officer to the nearest Turkish headquarters for a tug and an assignment to a safe anchorage in the city harbor. While the anchors were dragging one Turkish

excuse after another was made. There was lack of authority for the tug to be ordered out; there was an order necessary for the anchorage, and there was much time needed. In desperation the Egyptian officer went to the Germans for help. There was not only a tug available, but the yacht was towed to a safe resting place in the harbor with a sort of "Just mention me if any one troubles you!" And sure enough; when the Turks inquired by what right the Egyptians were there, the latter were let well alone at the mention of German authority.

The *Goeben's* commander in speaking of the Turkish naval forces, said that in trying to make the Turks act in stroke with the Germans, that the latter had been through a most trying and excruciating test of patience. One can imagine that a mixture of Teutonic energy and Moslem procrastination would breed anything but brotherly love and harmony. "These Turk sailors," he said, "can never understand why, when you tell them to do something now, that it can't just as well be done to-morrow afternoon."

This commander was once asked what was done on board the German ships to induce the men to acquire the knowledge necessary for petty officers' work. The answer was typically illustrative of German methods: "We order them to do it!"

During the early part of the war the attitude of the German military forces in Turkey towards Americans was that of particular cordiality. An instance occurred to illustrate it at the time of an American national holiday. Foreign ships present in the harbor were invited to join the American stationnaire in dressing ship in honor of the occasion. The *Goeben* was then anchored several miles up the Bosphorus. It so happened that, being stripped for action, she had no American flag on board. Nevertheless, a man was sent all the way down to the city, in spite of the late hour at which word was received, to procure from headquarters the desired flag.

During the first boarding visits on the *Breslau* by the writer, the receptions were even more hospitable than naval officers habitually extend to visitors calling officially. The German officers at that time were quite noticeably indoctrinated with the desire to spread among Americans the propaganda that Japan was preparing to make war against the United States, and that the only logical and safe course for America was to unite with Germany. One

heard the most ridiculous rumors about the preparations Japan was making. Along with the particular courtesy displayed during the boarding calls, these ideas of Japan were invariably introduced. The writer will always cherish the memory of one good bottle of champagne, entirely wasted on such propaganda on board the *Breslau*.

Undoubtedly many of the silly rumors afloat in the United States about the same time could be traced to German origin. The whole idea was provoking. It seems medieval enough for a modern nation to covet and seek to take by force the territory of its neighbors, without attempting to entrap other nations to do part of the work for them.

As far as we have heard, the *Goeben* and the *Breslau* still tie up in Stenia and still remain as visible illustrations of the Turkish vassalage to the Huns.

The entrance of Turkey into the war has far-reaching results:

1. A Russian fleet was tied up in the Black Sea.
2. The passage of Russian grain to the Allies was throttled.
3. The Allies lost the campaign at Gallipoli, including several battleships.
4. The Mesopotamian campaign was forced upon England.
5. The political effect on the Balkans aided in bringing Bulgaria against the Allies and keeping Greece out of the war. There were about 2,000,000 Greeks in Turkey who would have been put in danger by the entry of Greece against Turkey.
6. England was forced to throw enough troops into Egypt to prevent the occupation by Turks of the Suez Canal.
7. Russia was forced to send armies to the Caucasus Mountains.
8. A large part of the Armenian nation perished.

The sum of these losses is considerable. If one battle cruiser has been directly instrumental in causing them, one is obliged to credit her with proportional importance.

CONCLUSION

The activities of the *Goeben* emphasize a few principles of naval warfare:

1. The imperative value of quick and reliable communication with all naval forces upon or before the declaration of war. The *Goeben's* early notifications of war played a big part in her escape.

2. The value to a navy of cruisers that are capable of high speed and are fitted for independent work.

3. The value of the offensive. Instead of looking for a safe retreat from superior forces, the *Goeben* first deceived her enemies by attacking the Barbary coast, and second, by seeking in Turkish waters further activities that were wholly unexpected by the Allies.

4. The value of high speed. This factor was important in the escape from the Mediterranean. In the Black Sea it was the one advantage that made it possible for the Germans to carry on their raids and convoy work.

5. The importance of a naval officer's knowledge of international affairs. The Allies lost from the lack of knowledge of political conditions in Turkey that would have caused them to suspect and prepare for the *Goeben's* dash to the Dardanelles. The Germans, on the other hand, made gain of the political conditions that they had been instrumental in making. Also, the advantage to a world power is brought out—of having for each important maritime country a few naval officers that are thoroughly versed and trained in the politics, language and military conditions of that country.

In conclusion, a comparison of possible value may be drawn from the Bosphorus and the Panama Canal. The control of the commercial routes of another country, indirectly forced Turkey into war. For many years that control had exercised a continual pressure to throw Russia into war against Turkey. The Germans planned to take full advantage of that tendency. The *Goeben* was one of the visible agents employed in making the plan effective. The cruiser was strongly illustrative of a connecting link between international politics and naval warfare. A knowledge of foreign politics was of extreme value to her officers. To American naval officers the importance of international affairs is bound to increase. As the commercial and strategic sea lanes of Russia and Roumania lead through the Bosphorus, so do sea lanes of most of the great powers of the world lead through the Panama Canal. As naval stations and international sea traffic develop in the Caribbean, so will America be forced to meet with complex political and military conditions. And whether they can or cannot be amicably settled, the navy will hold an intimate relation with them all. It, therefore, seems that to American officers a knowledge not only of their own country's position in the Caribbean, but of all other powers, will be of particular interest.

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE PAY CORPS OF THE NAVY

A SKETCH

By PAY INSPECTOR DAVID POTTER, U. S. Navy

I

It has seemed timely to write a sketch of the pay corps of the navy for two principal reasons: First, because of the fact that the younger line officers of the navy know very little of the nature of the work of the older and more experienced officers of their brothers of the staff. This is inevitable from the conditions of naval service: the upper as well as the lower grades of the line serve at sea, but the upper grades of the pay corps do not. It thus occurs that the younger line officers see only the younger officers of the pay corps—officers entrusted with work of very grave, but not of the gravest responsibility. The work of the upper grades of the pay corps—the grades which furnish the motive force of the whole—is necessarily unknown to the younger officers of the line.

The second reason that seems to make this article particularly timely is the fact that the corps is receiving an unprecedented increase in numbers. From a body limited to 230 members, the corps has been increased to 446, an increase of 216 officers, or of nearly 94 per cent. This increase, of course, is in addition to the 300 or more officers appointed in the navy reserve for temporary service.

It is, then, not unreasonable to suppose that this great group of newly commissioned officers has only an imperfect understanding of the more important duties and responsibilities of the corps. It is even less unreasonable to suppose that such officers have not yet had opportunity to imbibe to the full the pay corps' traditions and esprit.

II

As compared to the navy as a whole, the pay corps had neither a small nor a humble beginning. On the contrary, it sprang, fully equipped in experience and confidence, from that same merchant

service—part free-trading, part privateering, wholly adventurous—in which the line of the navy had its origin at the beginning of the American Revolution. Just as the line officers of the navy in 1775 were chosen from men who had sailed the western ocean and the Spanish Main and the Pacific as merchant adventurers in the days when merchant adventurers had to be men of their hands, so the pursers of the Revolutionary Navy were the inheritors of the traditions of the men who had sailed on East or West Indiamen as supercargoes—direct representatives of the vessels' owners and managers of their business interests.

It was not a bad school to train officers in for the foundations of the pay corps of the navy. A supercargo at Salem or Boston, at New York or Philadelphia, at Baltimore or Charleston, who had fitted out a ship for a voyage to the Habana, to Bilbao, Capetown, Calcutta, or Macassar, had acquired experience invaluable for the proper equipping of a man-of-war. His work preliminary to the voyage in purchasing chandler and other stores for putting on board ship, his stowing of cargo for the Hougli or the Irrawaddy—these duties, *mutatis mutandis,* were not unlike some of the present duties of the supply-officer of a navy yard and the supply-officer of a naval vessel. Arrived beyond seas, his negotiations of bills of exchange with foreign merchants were in effect and even in form little different from those now carried on by a fleet paymaster.

There is a similarity almost startling, also, between the nature of the return ventures that must have been secured by supercargoes in pre-Revolution days and the nature of certain cargoes handled by officers of the pay corps during the administration of the present paymaster general: hemp from Manila, tin from the Straits Settlements, shellac from Calcutta, and sodium nitrate from Chile.

While the pursers of the navy of the Continental Congress sprang from the merchant service of the time fully equipped for their duties as they were then understood, yet the legal existence of such officers as a body is based upon United States laws and upon formal regulations.

As early as March 30, 1812, a United States statute demanded: "that the pursers in the navy of the United States shall be appointed by the President of the United States, by and with the advice and consent of the Senate." The further terms of this act

make it clear that the above requirement was only the legal recognition of a practice already prescriptively established.

The name "pursers" was changed to that of "paymasters" by the naval act of June 22, 1860. In the light of the greatly expanded and radically changed duties of the pay corps the name "paymasters" has to-day become almost as complete a misnomer as "pursers" had become in 1860.

A matter vital to the efficiency of the corps was secured by the passage of a law on July 17, 1861, requiring that all appointments "in the corps of paymasters" should be made by regular promotion from "the list of assistant paymasters." A change of equal importance was effected a year later. The chief of the Bureau of Provisions and Clothing—the paymaster general of the navy—legally, at any rate, whatever the practice may have been, up to July 5, 1862, could be a civilian. On that day the law required that he should be appointed from the "list of paymasters of the navy of not less than 10 years' standing."

On July 19, 1892, the name of the Bureau of Provisions and Clothing was changed to the Bureau of Supplies and Accounts. This change—like preceding ones—only recognized a condition already existing: the pay corps, from having had its functions limited to matters of money, provisions and clothing, gradually had had entrusted to it practically all the bookkeeping work and a very great part of the supply work of the entire naval establishment. Such affairs had been, or in due time were, committed to it by Congress and by the Navy Department—through the acts of March 2, 1889, of March 3, 1893, of June 25, 1910, and numerous other acts and regulations. The last act named, with its modifications, covering the naval supply account, especially placed the heaviest possible responsibilities upon the officers of the corps.

Such are some of the laws that have given legal status to the founding and continuance of the pay corps of the navy. But the reason for the establishment and operation of the corps has its root in the very necessities of civilization: the need that the business of the world should be carried on in a competent manner.

Business methods in the navy are not now on the defensive, if, indeed, they ever have been so. On the contrary, in many respects the methods of business administration of the navy serve as models for the methods of the civilian world. Specifically, the pay corps is recognized by the civilian business world to stand pre-eminent in the conduct of at least four kinds of affairs.

As purchasing agents for the obtaining of huge quantities of materials of the most varied kinds—the purchase and contract duties of the Bureau of Supplies and Accounts—the corps is not excelled by any organization of civil life. As custodians and issuers of such materials—the supply or general stores-keeping duties of the supply-officer of a navy yard—not even the railway stores-keepers handle the volume or variety that is handled in the navy. As providers of subsistence on the grand scale—the duties of commissary officers of ships—the largest industrial enterprises do not attain the magnitude of the navy's operations. As recorders and inspectors of the cost of fabricated materials—the cost-accounting duties of the accounting officer of a navy yard or of the cost inspector at a private shipyard—only chartered accountants of the widest experience stand on a par with certain officers of the navy.

That the vast business of the navy has been well conducted by the corps which is the business administrator of the navy is evidenced by tributes to its efficiency on the floors of Congress, by the matter-of-fact official records of the Navy Department, and by the convincing testimony of business men of the civilian world. So cumulative has been this evidence as to its efficiency that it has overwhelmed even those members of the corps who have felt it a duty not to assent too easily to such views lest pride should go before a fall.

III

Rear Admiral Bradley A. Fiske, in his "The Navy as a Fighting Machine," separates strategy into war strategy and preparation strategy, and subdivides preparation strategy into two parts: (1) The planning for war and for the handling of ships; (2) the construction, equipping, mobilization, provisioning, fueling and movement of ships. The officers of the pay corps are charged as of course with the actual accomplishment of the second part of preparation strategy, that part usually defined as logistics—the art, in this case more nearly the science, of transportation and supply. The planning for the conduct of logistics—the strategy of logistics, so to say—is a duty of the office of the chief of naval operations; but the practical application of the policies set forth by that office is entrusted to the Bureau of Supplies and Accounts.

In carrying out this truly great undertaking, the exercise by the pay corps of what are in reality several different professions,

distinct yet closely interlocked, must be observed. In any description of its work it has been customary to define these different professions by the official designation under which each group is carried on, *e. g.*, the duties of the supply-officer of a navy yard, the duties of the supply-officer of a naval vessel, or the duties of an accounting officer. There has been a tendency, therefore, to regard all of the duties performed under each of the above designations as duties of the same sort. But this procedure, as well as the nomenclature used, has no other logic to support it than the logic of administrative convenience. For the present purpose, a more exact distinction between the different kinds of businesses handled by the corps is advisable.

The principal businesses, therefore, regularly practiced by the officers of the pay corps in the performance of their daily duty are as follows:

(1) Financial and monetary administration.
(2) General supply.
(3) Transportation.
(4) Contractual and purchasing.
(5) Disbursing of moneys.
(6) Commissary.
(7) Cost accounting.
(8) Military.
(9) General executive and administrative.

To these nine different kinds of businesses a tenth might be added, viz., Legal. But this is so much an essential part of each of the others that its designation as a separate kind is, perhaps, hardly advisable.

IV

FINANCIAL AND MONETARY ADMINISTRATION

A few years ago the writer had occasion to discuss naval financial matters with one of the vice-presidents of the National City Bank of New York, an institution which, perhaps, more than any other of the sort, is concerned with the international banking and trade operations of Americans. At the conclusion of our discussion this gentleman remarked: "I have been in the banking 'game' for 35 years and I've specialized in foreign exchange for 25 years, but until I talked with you, I never even thought to wonder who it was that handled the financial side of the navy."

This remark was not at all surprising: it was merely a particular expression of a general lack of knowledge that civilians have in regard to naval affairs, above all, of naval business affairs. If civilians when they read in their daily newspaper that an admiral or other naval commander has assumed charge of affairs in Haiti or San Domingo or Mexico or Nicaragua, "even thought to wonder" how such naval commander could be competent to handle the serious financial questions involved, it would probably be clear to their minds that such matters were not actually handled by the naval commander in person. It would be evident to the inquiring civilian that connected with the staff of the naval commander must be one or more officers trained for the particular purpose of handling fiscal affairs. The commanding officer of forces engaged in military occupation can do no more at most than to outline to his fiscal officers the general policy established by himself or the general course necessary to carry out the policy enjoined upon him by higher authority. Neither his training nor his inclination permits him actually to have in mind, far less to direct, how financial or monetary affairs shall be handled in order to accomplish the purposes of the national government.

As occasions arise in the navy, therefore, officers of the pay corps are entrusted with fiscal affairs of the first importance, such as are handled in civil life only by officials of the longest possible experience. Upon such occasions officers of the corps must bear monetary and financial responsibilities of the weightiest kind. Decisions are made daily involving the economic and political welfare of a numerous population. For the proper performance of such duties neither natural ability nor wide practical experience as a naval officer is sufficient; but ability and experience must be supported by intensive study of the history and practice of finance or by academic instruction in it.

Under such circumstances, the officer concerned is and always must be thrown entirely upon his own knowledge—responsive to his own decisions—as to all matters pertaining to the fisc. In administering the monetary affairs of "little, turbulent republics" he must rely upon himself to distinguish between a banking reserve and a currency reserve; to understand that the truth of Gresham's law to the effect that "bad money always drives out good" is as immutable as a law of nature, but is limited in its application by the force of Ricardo's corollary to the effect that bad money drives

out good only when there is an excess of currency in circulation. It is his own responsibility if he is not convinced that the only real reserve against paper currency is a metallic reserve; that a high bank rate leads to an increase in the metallic reserve; that a low bank rate leads to a decrease. For an officer of the corps engaged in foreign occupation it is not merely an academic matter to realize that two of the great functions of a bank—deposit and discount—are not necessarily inseparable from the third great function—that of issue. As a matter of statesmanship hardly less than of finance it is a danger if he is not unshakeable in his belief that the parity of a country's currency is maintained by reducing the circulation in times of plenty and increasing it in times of scarcity.

During the military occupation of a foreign country, the adventures that fall to the lot of an officer placed in charge of fiscal affairs are innumerable—some of them, at least, semi-tragic; some, perhaps, only semi-humorous.

Accompanied by a guard armed *cap-a-pie* he may have to go from bank to bank in order to impress upon the unfortunate bank managers the advisability of presenting a daily bank statement to him in his official capacity. He may have to break open on board merchant steamers boxes innocently marked: "Stationery"—in order that he may seize the bank-notes lying *perdu* therein, and so save an unhappy country from receiving an additional contribution to an already worthless currency. In order to sustain a faltering national credit he may have to send wagon loads of money through the public streets and to unload them with ostentation before the doors of banking institutions. Under the policy established by higher authority, he may be authorized to receive as legal tender the paper currency of banks which he knows have been burned to the ground months before and whose metallic reserves he believes have been scattered by banditti to the four winds of heaven.

Chance naval operations in the days of the old navy placed upon officers of the pay corps financial responsibilities—not to speak of logistical ones—which must in those days have seemed sufficiently serious. Such responsibilities were those of the officers who acted as naval agents in different parts of the world—in Nice, Port Mahon, Naples and Rio de Janeiro. Although these agencies have long been abandoned, yet almost within the recollection of

the writer, Pay Director Frank C. Cosby represented the navy at the first-named port and Pay Director Albert S. Bacon in the last-named.

Of this sort, too, were the negotiations conducted in London in 1872-1874 by Paymaster General John O. Bradford. Leaving the Bureau of Supplies and Accounts in charge of Acting Chief of Bureau James H. Watmough, Paymaster General Bradford spent the greater part of two years on duty in Great Britain.

Such matters, however, were merely resultants of the operations of the navy arising through a haphazard national policy. In more recent years, the deliberate policy of American expansion, working through the navy as one of its instruments, has brought about maturely planned and carefully carried-out operations on the part of the pay corps.

As early as 1905, Pay Director James S. Phillips took over the management of the fiscal affairs of the customs of the republic of San Domingo. After the recent rearrangement—in 1916—of the affairs of San Domingo by the United States, Paymaster I. T. Hagner, a member of the staff of the naval commander, was appointed to act in the place of the Secretary of Finance for the republic, and still acts in that capacity. Farther to the eastward, Paymaster David C. Crowell is at present (1917) detailed as financial adviser to the naval governor of the Virgin Islands—Danish West Indies.

At the western limits of the Caribbean, Vera Cruz was occupied by our forces in April, 1914. Here, for more than a week's time, the general business operations of the city were controlled by Paymaster C. J. Peoples who was put in charge of the quartermaster and commissary work of the expeditionary force.

Perhaps the most illuminating example of financial administrative work was lately observable in Haiti. In 1915, after a preliminary experience of several months' duration as fiscal officer at Vera Cruz, Pay Inspector Charles Conard was made financial adviser and administrator of customs of the republic of Haiti. In these capacities he was able not only to improve the collection of customs, but, also, to assist in reforming the currency of Haiti —bringing the value of the *gourde* to a stable level at the rate of five *gourdes* to the American dollar. This was a monetary feat up to that time declared by the most experienced American financiers to be impossible.

V

GENERAL SUPPLY

If it were necessary to decide which was the principal one of the professions of the pay corps—the very backbone of its work—perhaps the answer of the majority of its officers would be: "Supply." More particularly, perhaps, the opinion might be hazarded that the supply-officer of a navy yard—formerly known as the general storekeeper—is the pivot upon which swings the whole logistical side of the navy.

Passing over the very important supply work done by the pursers and paymasters of the old navy and by the pay corps of the new navy, in the way of keeping the naval establishment equipped with money, provisions, clothing and yeomen's stores, we come to the true beginning of a real general-supply system for the navy—that inaugurated in 1886.

A comprehensive system of supply—the general stores-keeping idea—was put into tangible form by Paymaster General James Fulton and certain officers attached at that time to the Bureau of Supplies and Accounts. Among these officers were Pay Director Luther G. Billings and the subsequent paymaster general, Albert S. Kenny, then senior assistant in the bureau. The former was a member of the board which drew up the first set of instructions for the conduct of supply departments. The latter first developed the idea of keeping records by classes of the receipts and expenditures of materials, and of keeping records by titles of the expenditures against appropriations. At the suggestion of the bureau, Mr. W. C. Whitney, Secretary of the Navy during a part of the first administration of President Cleveland, issued an order in December, 1886, establishing a comprehensive general-stores system. This, in brief, was a consolidation of the purchase, custody and issue of all materials—except ordnance, medical and marine-corps materials—in one group and one system, administered by the Bureau of Supplies and Accounts. It is not too much to say that without the establishment of some such method, and without its effective administration, the ships of the new navy could never have been built nor have been kept efficient after they had been built.

Although, after the formal authorization of the general stores-keeping plan, the records of supply transactions were so kept in

the bureau itself as properly to record the movements of materials and the consequent charges against appropriations, yet the various supply-officers stationed at the different navy yards were compelled, each for himself, to develop the practical applications of the bureau's general plan. Each supply-officer handled matters largely as he saw fit. From this somewhat chaotic, although by no means inefficient situation, the navy was rescued largely by the genius of Pay Director John A. Mudd.

After a careful study of the elements involved, and after wide, practical experience as a supply-officer, Pay Director Mudd prepared and the bureau published "A Manual for the General Storekeeper's Force at Navy Yards and Stations"—made applicable to the New York Navy Yard in 1899, and to all navy yards by 1902. This was a book of several hundred pages, giving an orderly, clear-cut, and remarkably complete description of the general-supply system. It was so arranged as to be applicable to a force of any size at any naval station, large or small, and was so exhaustive as immediately to become the definitive authority in the matters with which it dealt. This authority it remained until changes in laws and in business methods made the terms of the manual largely obsolete—but not before the principles Pay Director Mudd had laid down had thoroughly indoctrinated the pay corps with knowledge of the proper conduct of the business of supply. Pay Director Mudd is still known—and very justly so—among the older officers of the corps as "the father of the general-supply system."

Since the earlier days referred to, the efficiency of the supply system has been greatly increased by the contributions of many different officers—by the supervision of supply matters on the part of Pay Director John S. Carpenter throughout a long experience; by a radical revision of the classification of naval material on the part of the late Pay Director George W. Simpson; by the development of the provisions and clothing factory at the navy yard at New York, on the part of Pay Director Charles S. Williams; by the real usefulness first achieved for the naval supply fund—forerunner of the present naval supply account—on the part of Pay Director Thomas S. Jewett; by the establishment of improved methods at the navy yards in Philadelphia, Mare Island and Washington, on the part of Pay Inspector E. W. Bonnaffon; by the recent administrative direction of supply matters on the part of

Paymaster V. S. Jackson; and by the activities of various other officers. It is to be regretted, however, that there is as yet no adequate supplement to the "Manual for the General Storekeeper's Force." The general work of the supply departments ashore, as at present conducted, has no complete exposition in print—it can only be studied in practice or from the instructions issued by the Bureau of Supplies and Accounts or from the casual excerpts of the Navy Regulations. A particular phase of supply-department affairs has, nevertheless, found admirable expression in the "Standard Stock Catalog" prepared by Pay Director T. H. Hicks under the authority of the bureau.

It is the duty of the supply-officer of a navy yard to assemble, to store and to issue materials of every kind—except ammunition and medical and marine-corps' stores—that may be needed by the vessels basing on the yard concerned or for use for manufacturing purposes at the yard. When one considers that during the year 1916 at one navy yard, and that yard not the largest, about $5,000,000 worth of supplies was received and about $4,500,000 issued, and that a stock of about 30,000 different kinds of items, aggregating in value over $4,000,000, was maintained at all times, it will be realized that the importance of the work of the supply-officer of a navy yard is literally almost inestimable.

The intricacy of the machinery which enables the navy yard to meet the requirements of the fleet can only be understood by persons who are actually engaged in and responsible for its handling. A line officer who in reporting for duty on board ship finds that every kind of material either is at hand or can readily be obtained to the required amounts, naturally is concerned only with this satisfaction of his need. The methods by which his requirements are met do not concern him—they lie in the hands of the officers of the pay corps. If any officer of experience will check over in his mind the occasions in which he has been disappointed in securing what he has needed in the way of important materials, the very infrequency of such occasions will sufficiently evince how successfully this part of the work of the navy is carried on.

Important as is the work of the supply department of a navy yard the sole reason for its existence is the fleet. The supply department afloat—aside from its commissary and financial duties, which have been considered elsewhere—is the resultant of the preparations made by the supply department ashore. It involves,

however, this additional feature the supply-officer afloat, unlike the supply-officer ashore, issues material for final consumption. It is in such issue that all the painstaking preparations in regard to matters of supply ashore find their final expression.

It is not the intention to convey from the foregoing that the employment of originality and ability is denied to officers of the corps afloat. No matter how clearly laid down in general the authorized procedure of business administration may be, there is always the necessity for the exercise of resourcefulness in carrying out such procedure. As a matter of fact, no such routine as is possible for a supply department of a navy yard is possible for the supply department of a ship. Nevertheless, the laws and regulations relating to the duties of the corps at sea have been formulated in a "Manual for Supply-Officers Afloat," prepared in 1914 by Paymaster George P. Auld. Without this manual as a veritable guide and guard the path of the newly commissioned officer of the pay corps would be thorny, indeed.

In a wider field, such seagoing officers as the fleet paymaster and the fleet supply-officer have the freest powers allowed them—according to conditions—in respect to the contracting for and purchasing of materials. The conduct of such affairs by the then pay inspector, Samual McGowan, fleet paymaster, during the cruise of the battleship fleet around the world in 1908-1909, is an example in point. His pamphlet, "Operations of Pay Department of the Atlantic Fleet on Cruise Around the World" (Senate Document No. 646, 61st Congress, 2d Session), should be consulted by officers who are likely to be charged with similar duties.

VI

TRANSPORTATION

The matter of transportation of material, both by rail and by water, is one of the principal duties of the supply-officer of a navy yard as well as of the officer in the Bureau of Supplies and Accounts who may be designated for the purpose of general supervision. Like so many other duties of the corps—and, indeed, of the navy as a whole—knowledge of affairs of carriage must be grasped as much by means of experience as by means of books.

The supply-officer of a navy yard, who receives by rail- and water-connections millions of pounds of freight a year and ships

out as many, continually bears in mind that the New England, the Southern, and the Western are the three great freight classifications of the United States; that each of these great groups are divided into six others according to the chief kinds of materials; and that within each of these six minor groups further subdivisions are almost innumerable by reason of refinements of quality and of quantity in which shipped. And then the whole original classification, simple enough at first glance, receives almost inextricable complications by the admission into it of about eleven hundred "special tariffs."

In arranging for shipments the supply-officer of a navy yard—unless time is an object—marks his routings in such fashion as will effect the cheapest transportation for the government, taking into consideration allied railway and steamship companies. It is useful for the supply-officer to remember that railroads are grouped with considerable relation to their financial as well as their geographical situations. The facilities of transportation between railroads and steamships may or may not be the same in the Vanderbilt group as in the Gould group, and neither may be identical with those of the Hill or the Morgan group. The rates secured for the navy by such arrangements as were made by Paymaster E. C. Tobey while serving as supply-officer at the New York Navy Yard, have effected substantial savings for the government.

On the wall of the supply-officer's office maps of various sizes, duly colored, afford him ready information as to the different lines of railroads, as to the transfer and junction points of the different lines, and as to the main divisions of the tariffs concerning such matters, for example, as the long haul and the short haul. Maps can also show to great practical advantage the chief locations of raw materials, such as the iron mines of the Mesaba Range in Minnesota—the principal source of ore for the United States Steel Corporation—the copper mines of the Anaconda and Calumet Companies in Montana and Arizona, the lumber "stands"—redwood, hard pine, hemlock, and soft pine—of Washington, Michigan, New England and Florida, and the coal mines of the Pocohontas and Georges Creek country.

Knowledge of many practical details is indispensable to the daily conduct of the transportation side of a supply-officer's duties. When he ships a 13-inch gun from Washington to New York he takes care to avail himself of the special gun-cars of the Pennsyl-

vania Railroad Company. He makes sure that certain explosives are so routed as to pass around a city and not through it. By urgent telegrams and otherwise, he satisfies himself that perishable freight is not "embargoed" at transfer points. In shipping miscellaneous material, he decides what is suitable for a box-car, what for a gondola, and what for a "flat," and whether a "48 footer" or a "60 footer" is necessary for his purpose.

The formerly vexatious question of shipment over land-grant and bond-aided railroads has become a comparatively simple one since the passage of the law requiring other companies to equalize their tariffs with those of the land-grant and bond-aided roads. So, also, since the stabilizing power of the Interstate Commerce Commission has become effective, the matter of car-demurrage debits and credits is one that no longer lies subject to the uncertain policies of the particular railroad concerned.

VII

CONTRACTUAL AND PURCHASING

In their essence, the contracting and purchasing duties of a supply-officer, both afloat and ashore, are different and distinct; but in practice they are almost inseparably linked in both positions.

Of all the businesses of the pay corps those involved in the contracting for and the purchase of materials are the ones which differ least from the corresponding businesses of the civilian world. It is true that, in the navy, numerous statutes of the United States, numerous regulations of the Department, and various sets of instructions issued by the Bureau of Supplies and Accounts, must be obeyed in making practical application of the principles of contract and purchase. Nevertheless, the principles themselves differ hardly, if at all, from those followed by purchasing agents and contracting officials of the largest mercantile and industrial corporations.

Bearing directly on the contract work of the navy, Paymaster C. J. Peoples' monograph on "Business Methods of the Bureau of Supplies and Accounts," published in the bureau's Memoranda No. 96, of March 1, 1909, gives in tabloid form a view of such affairs as they were at that time.

The contract and purchasing sections of a supply department of a navy yard have the same physical aids to their duties as the

corresponding sections of the Standard Oil Company or the International Harvester Company or the Pennsylvania Railroad have: card indexes of different kinds of materials and of the names of dealers in such materials, statistical bureaus' reports, daily market reports, trade journals and bulletins, and allied devices, in order that the officers and clerks concerned may have at hand the latest information in respect to past and current prices. Of course, also, requests for bids are sent out to contractors, tenders are received from them, and awards are made to them in the regular manner.

While the work of the purchasing section of the supply department of a navy yard does not differ widely from the corresponding work of the civilian business world, yet matters are materially otherwise when it comes to the administrative end of such work as conducted in and from the Bureau of Supplies and Accounts. Prior to the beginning of the present war, the bureau carried on its books property valued at something over $900,000,000—a sum very nearly equal to the national debt at that time. The values it now carries one would not venture to guess! Of the amount of $900,000,000, more than $200,000,000 represented stores and work in progress. In order to be able to accumulate supplies of such value and to be able to maintain them the contract section of the bureau must work with a smoothness, speed and accuracy amounting almost to infallibility.

It is not the purpose of this article to attempt to describe how this work is accomplished. It is sufficient if the reader, whether an officer of the line or an officer newly appointed to the pay corps, realize that years of thought and of practical expression of that thought have gone into the accomplishment of the task.

VIII

DISBURSING OF MONEYS

It is as a consequence of action taken by the Bureau of Supplies and Accounts that money—or more exactly, credit—is placed in the hands of the officers detailed for the time being to handle money.

The supply-officer of a vessel, in his capacity as financial officer of the ship, pays the officers and enlisted men attached to the ship their salaries as provided by law. He pays, also, the public bills covering charges incurred on account of contracts, whether written

or parole, entered into by him for the purchase of such materials or services from civilians as he may find necessary. At a home port, such necessity arises by reason of exigency of time, and at a foreign port, arises by reason of exigency of distance.

The disbursing-officer of a navy yard, in his capacity as paymaster of the yard, pays the labor and clerical rolls for civilians employed at the navy yard or in the naval district. The officers attached to the navy yard, also, have their accounts carried on his rolls. He pays the public bills on account of the contracts made by the supply-officer of the yard, and reimburses officers for expenditures made by them in traveling under official orders. An important part of his work consists in handling the complicated money transactions arising out of the sales of government material at public auction after inspection, condemnation and appraisal. Finally, he makes advances as authorized by law and regulations to officers ordered to duty at sea or abroad.

The disbursing-officer of the Bureau of Supplies and Accounts is stationed in Washington. His responsibilities are exceedingly heavy—it is probable that, taking one month with another, he disburses more money for specific purposes than does any other single person in the United States. He pays bills covering the construction of vessels built for the navy by civilian shipbuilders, bills for heavy ordnance materials manufactured at private establishments, bills for other bulk materials and for freight. This officer also disburses the amounts required for the payment of allotments of individual pay made by the personnel of the navy in favor of their dependents or for their savings.

Considerable amounts of money in cash are placed in the hands of the fleet paymaster on each naval station. One of his principal duties, as his official designation betokens, is to issue approved sums to the officers of the separate vessels comprising the fleet in which he serves.

Besides the officers of the pay corps, who may be regarded as the natural and regular custodians and disbursers of funds, there are other officers and officials who, on account of the special nature of their duties, receive money from the bureau for the purpose of making certain payments on behalf of the navy. This group includes the naval attachés of the various legations and embassies, some consuls and consul generals who have cognizance of certain

matters pertaining to the Navy Department's interests abroad, and officers of the line engaged in recruiting duty.

Since the beginning of the present war, moneys have been placed in the hands of certain officers of the corps known as district disbursing-officers—as distinguished from disbursing-officers of navy yards. A district disbursing-officer pays officers and enlisted men of the United States Naval Reserve Force who may be attached for duty within his particular naval district. His duties include, also, payment of bills on account of contracts made by the district supply-officer.

From the preceding incomplete list of the different sorts of disbursing-officers of the navy, it will be seen that naval expenditures attain notable proportions. At the present time, upon the requisitions of the paymaster general, warrants are issued in the treasury department, and corresponding credits placed on its books, to the officers concerned, in the amount of about $40,000,000 a month. To expend such sums in a manner wholly in accord with law and to be able to endure *after the fact* the rigorous scrutiny of the treasury department officials requires a system superior to that required for the most extensive disbursements of the civilian world. The apparent simplicity of the system as developed is deceptive—it is in reality the result of the skilful co-ordination of many complicated parts.

Civilians often ask how the navy obtains money in foreign ports when it becomes necessary to replenish the ship's supply of cash. This is ordinarily a matter of the sale of a bill of exchange—under particularly favorable circumstances, a matter of the cashing at its face value of a United States treasury check.

The method by which a bill of exchange is negotiated, whether by the fleet paymaster or by the finance officer of a particular ship, is outlined in skeleton fashion in the Navy Regulations. But the actual negotiations require both a practical and theoretical knowledge of financial affairs. If the fleet paymaster wishes to pay a local dealer at Hong Kong for coal he may have purchased for the fleet, he must know that the rate quoted him by the Hong Kong and Shanghai Bank of "2 and 15/16" refers to the value of the Mexican dollar in shillings and pence and not to its value in United States currency. If the supply-officer of a vessel wishes to pay the ship's crew at Bordeaux, it is necessary for him to realize that the quotation given him by the Credit Lyonnais of "25" expresses a

ratio of the number of francs to the pound sterling and not of the number of francs to the gold dollar. If he desires to arrange for a supply of coffee at Rio de Janeiro he will be in serious difficulties unless he understands that the equivalent quoted by the Bank of Brazil as "16.32" relates to the value of the Brazilian milreis as compared with the English sovereign.

IX

COMMISSARY

So accustomed is the navy to think of commissary work as one of the essential parts of the duties of officers of the pay corps, that it has already almost forgotten that until 1901 the actual messing of the ship's company lay wholly in the hands of the officers of the line. Until about the middle of that year it was the executive officer of the ship and not the supply-officer who was responsible if the food were badly cooked and badly served, or who answered at the mast the complaint of a luckless member of a "scupper-mess."

It is true that the contracting for and the purchasing of provisions in bulk were matters coming within the cognizance of the Bureau of Supplies and Accounts. So, too, the responsibility for the custody and issue of provisions in bulk lay with the supply-officer of the ship. But from the moment of issue to the "mess cooks" at the door of the provisions' storeroom, supervision of the subsistence of the crew, including all details of messing and cooking, was one of the routine duties of the executive officer. That magnificent personage, the "ship's cook," who, pipe in mouth, wandered about the galley, and whose sole responsibility seemed to the awe-struck outsider to be limited to his graciously allowing the mess cooks to boil coffee in "his galley"; the "mess caterers," nearly always inefficient and too often defaulters; the unhappy mess cooks, much enduring men of woe—these individuals were subject only to the directions of the executive officer. In the light of the present time it is truly astonishing that such duty should ever have been considered compatible with the general duties of the ship's executive, and it is not to be wondered at that the success of this system was wholly negative.

In 1901, under the pressure of opinion of the united service, subsistence proper, as well as the obtaining of the necessary supplies for such subsistence, was placed in the hands of the pay corps. Upon the corps' success in this part of its duties it seems

unnecessary to dwell. Every seagoing officer would probably be willing to bear testimony to the efficiency of the present commissary system. The proper solution of the problem of foods is as vital as the proper solution of the problem of ships and ammunition. Until the beginning of the present war the navy's 50,000 men were fed several times a day in all parts of the world without the least hitch—within a few months, the number of men subsisted has increased to more than 200,000, and still without hitch.

Work of this nature, being the daily monotonous fulfillment of a homely duty, is devoid of spectacular features, although of never-ceasing interest to every being who lives by bread! Nevertheless, a tyro cannot be a successful commissary officer, nor are commissary methods the outcome of chance: energy, ability and thought must be devoted to the carrying out of this work. The methods of commissary work formulated some years since by Pay Inspector George P. Dyer are still sound models in this direction. His book, "The Ship's Commissary," is well-nigh indispensable to a commissary officer.

X

COST ACCOUNTING

The navy was peculiarly fortunate in having a group of its officers recognize the importance of the keeping of proper records of the costs of fabricating articles at a date almost as early as the importance of keeping such records was recognized in the civilian business world. It was even more fortunate than the greater part of the business world is to this day, in going earnestly to work to establish a proper cost-accounting system.

The first efforts to carry the costs of labor into the costs of fabricated articles in some formal manner was made in 1899. In this year, Pay Director John S. Carpenter was assigned to special duty in the office of the Secretary of the Navy, Mr. John D. Long, and while on this duty, established for use in navy yards the first satisfactory time-card system. This procedure was a long step in advance of anything that had been accomplished in that direction up to that time, and was, in fact, the forerunner of a true cost-accounting plan. Several years were to elapse before more definite measures were taken.

In 1908 Pay Director John A. Mudd and Pay Inspector Charles Conard were detailed by Paymaster General Eustace B. Rogers

for the purpose of making a study of cost-accounting methods at civilian plants with a view to preparing a plan for a cost-accounting system for the navy. Each of these officers prepared a complete plan. The one presented by Pay Inspector Conard was accepted by the bureau and by the Navy Department—the cost-accounting system of the navy was put into operation in 1909-1910. While the methods adopted at that time have inevitably been modified and improved upon since, yet even then they were at least as highly advanced as the cost-accounting methods of the civilian world. Pay Inspector Conard, therefore, has somewhat the same relation to the cost-accounting system of the navy that Pay Director Mudd has to the general-supply system.

It remained for a Board on Accounting, of which the then pay inspector, Samuel McGowan, and Paymaster D. V. Chadwick were members, to emphasize and to put into force a distinction—already expressed in the memorandum plan of Pay Director Mudd of several years before—between cost accounting and appropriation accounting. The clear recognition of this distinction by these officers, and its enforcement in 1915, enabled a serious drawback in cost-accounting methods to be remedied. Paymaster G. P. Auld, under the direction of the bureau, has laid down the present authorized procedure in a "Manual for Accounting Officers."

At a navy yard, the cost-accounting system maintained by the officer of the pay corps detailed for duty as accounting officer enables records to be kept of the costs not only of the construction of vessels, but also of the costs of articles manufactured and of articles repaired. Outside of navy yards, it enables officers of the corps detailed as cost inspectors to keep a selective and corrective check at civilian shipyards of vessels being built or repaired for the navy on a basis of actual costs plus an allowed percentage of profit. Also, cost inspectors are detailed at various manufactories for the purpose of checking the records of costs of gun forgings and other ordnance material under construction for the present exigency of war. The cost-inspection duties of the pay corps present a new and interesting phase of cost accounting wherein opportunities for study and experience are almost limitless.

No claim is advanced that the cost-accounting system of the navy even approaches perfection. That this is the case is due partly to reasons of governmental policy, and largely to the difficulties caused by an antiquated arrangement of appropriations.

The articles and recommendations of such specialists in appropriation matters as Paymaster General T. J. Cowie and Pay Director Livingston Hunt have as yet had little effect in inducing a change for the better in respect of the arrangement of appropriations.

But the pay corps, after more than 15 years' study of cost accounting and nearly 10 years' experience in it, have attained at least five invaluable results: It has developed a considerable group of officers with particular ability as cost accountants. It has accumulated a great amount of material in the form of cost records ready for reference. It has produced a plan and a method capable of expansion to the highest possible degree of usefulness—as is shown by the matter of cost inspection above referred to. It has helped to persuade the officers engaged on the fabricating side of the navy to study and to enforce economics in production. And it has given the navy a realization of the great advantages to be found in that proper national budget which has been the hope and dream of all American cameralists.

In addition to these points, and even under an accounting system admittedly short of perfection, the methods as they exist are found indispensable wherever the officers engaged on the fabricating side of the navy have learned to avail themselves of cost records. At present, it is in this direction—a clearer understanding of the potentialities of " executive's cost reports "—that the greatest usefulness of the cost-accounting system lies.

XI

MILITARY

The military duties of an officer of the pay corps afloat are those of his duties which are perhaps best known to his shipmates of the line. Nevertheless, the magnitude of his share of such duties is sometimes not realized even by the watch officers who assist in them.

A careful calculation made two or three years ago by Paymaster Chester G. Mayo, while attached to the flagship of the Atlantic fleet, showed that not less than one-fifth of the supply-officer's waking hours must be devoted to strictly military duties. Reports from another officer indicate that since the beginning of the present war military duties consume about 40 per cent of a supply-officer's time. If this amount of time is required for military duties on board a capital ship, it is probable that the proportion of

such duties performed on smaller craft where the number of officers is limited is very much greater.

To the civilian not in close touch with the naval service it may come as a surprise to know that on board ship an officer of the pay corps is detailed for duty in charge of the fire-control system of the ship, or controls the powder division, or is chief spotter, or is assistant signal officer, or at general quarters is an additional aide to the commanding officer, or in landing parties commands the machine-gun detachment or the pioneers or a section of blue jackets as infantry.

Officers of the corps have fought on board every ship—except those of the smallest size—that has ever been under fire from 1775 to the present day. They have been with the advance columns of bluejackets and of marines in Tripoli, Formosa, Cuba, China, Nicaragua, Mexico and the Philippines, and wherever else the navy has landed.

During the occupation of California by Commodore J. D. Sloat in the war with Mexico, Purser D. Fauntleroy commanded a company of dragoons made up of officers and men selected from the fleet. Pay Director William Wilson Galt was advanced in numbers for extraordinary heroism during the war with Spain. Pay Inspector D. A. Smith commanded part of the secondary battery on Dewey's flagship in the battle of Manila Bay. The late Pay Director George W. Simpson, in command of a captured Spanish vessel, sailed her from the coast of Cuba to the harbor of New York.

Pay Director Francis Henry Swan is recorded in the Naval Register as "advanced for eminent and conspicuous conduct in battle during the Civil War." Honorable as this line of type is as attached to Pay Director Swan's name in the Register, it only illustrates the distinction that came to him during the Civil War when Lieutenant W. B. Cushing chose him as the only commissioned officer to accompany him on the incredible expedition that resulted in the blowing up of the Confederate ram *Albemarle*.

Of interest to the psychologist of the combative spirit, as well as to the historian of it, is the fact that of the 80 or more duels fought by the officers of our navy in the past a due proportion was engaged in by officers of pay corps. The most celebrated duels —or series of duels—of our navy, next to the duel between Decatur and Barron, were those arising out of the challenge by

Purser Benjamin Bourne, of the U. S. S. *Erie*, to all and sundry of the officers of His Majesty's Sixty-Fourth Regiment of Foot—at Gibraltar in 1819. Under the lead of Purser Bourne the officers of the *Erie* entered the mess room of the Sixty-Fourth Foot and "posted" a certain officer of that regiment as a coward—with Homeric results.

XII

GENERAL ADMINISTRATION

The efficient conduct of all the varied professions of the pay corps, however it may be sustained by the energy and devotion of the officers engaged in handling the actual details of such professions, is, in the last analysis, dependent upon the ability possessed by the administrative officers on duty in the Bureau of Supplies and Accounts in Washington.

The type of mind of the officer competent to handle the work at a navy yard or on board ship is not necessarily the same as the type of mind of the competent administrative officer in the bureau. It is entirely possible—indeed, it sometimes happens—that a good seagoing officer does not make a good bureau officer, or *vice versa*. However, other things being equal, faithful performance of duty "in the field" trains an officer in the exercise of those qualities that fit him to direct administration.

The administrative officers of the corps have been able to conduct the immense business of the navy only by keeping their minds unclogged by the details of that business. In order to direct properly, the persons in whose hands the carrying out of details must lie, no inconsiderable amount of imaginative power must be possessed by those responsible in the large sense for administration. So overpowering is the machine technology of the navy, so overwhelming is it in the sheer bulk and application of material, that it is only by conscious effort and with difficulty that the mind can be kept clear for the wider range of thought necessary to furnish the motive force for the technological material.

Rear Admirals Goodrich, Fiske and others, in one form or another have repeatedly pointed out the danger to the strategic sense of the line officers of the navy in allowing that sense to be crushed by unswerving attention to technique. It will probably be conceded—certainly by almost anyone who has served in the office of the Chief of Naval Operations or who has taken a course

at the War College—that the motive power of the navy as a whole has been seriously hampered, until recently at any rate, by this embarrassment of the administrative sense by the technical sense. The pay corps has been happy in that its administrative heads, while unflinchingly demanding the closest supervision of details by the officers charged with such duty, have also unflinchingly demanded for themselves mental and physical freedom from such details. In no other way can good work be done *expeditiously!*

Walter Bagehot, in his celebrated essay on "Lombard Street," in referring to one who has heavy responsibilities, remarks: ". . . . If such a man is very busy, it is a sign of something wrong. . . . . working out detail which subordinates would do better, and which he had better leave alone . . . ." It has been the great good fortune of the pay corps that it has had at its head for many years officers who have recognized that the power of handling well the general and the particular at the same time has never been found in one man—unless it were a Napoleon. Acting in harmony with this principle, the corps has been able to develop its full share of able and even of eminent administrators.

Of such was Gideon Welles. In his person the pay corps had an honor done it that no other corps has had—that of having its one-time head appointed Secretary of the Navy. Gideon Welles, chief of the bureau from 1846 to 1849, was appointed Secretary of the Navy by President Lincoln. He served as one of the most distinguished and resolute members of that distinguished and resolute cabinet, continuing his service until the close of President Johnson's administration in 1869.

The solid and pertinacious qualities of Horatio Bridge, paymaster general during the whole period of the Civil War, enabled the bureau to endure successfully the tremendous responsibilities of that trying time. When the sudden growth of the navy during the Civil War is remembered—a growth only equaled by that of the present war and on a much less adequate foundation—the ability necessary to supply the ships under such conditions may be realized. The naming in his honor of the supply ship recently launched, the *Bridge,* is a tribute to the high character of his work.

Paymaster James Fulton has been already referred to as primarily responsible for the establishment of the general supply system in 1886-1887. Paymaster Edwin Stewart, chief of the bureau during the war with Spain, will long be remembered with

admiration in the navy—so, too, will his assistant, Paymaster A. K. Michler, whose resignation deprived the service of an officer of creative genius.

Among its able and forceful administrators, have been H. T. B. Harris, paymaster general from 1903 to 1906, and Eustace B. Rogers, paymaster general from 1906 to 1910. Each of these officers in turn directed the duties of the pay corps and interested himself in the general affairs of the navy with notable success.

Under such administrators or under those of like character and attainments, officers of the corps have become fitted to undertake the handling of affairs in the most varied emergencies. Space will permit of only a few illustrations.

The settlement in 1887 by Pay Director John R. Martin, of the business affairs of the slave-trading island of Joanna off the east coast of Africa, is one of the most picturesque episodes of the navy. Paymaster E. C. Tobey and Paymaster George C. Schafer in 1905 established the first supply system and the first disbursing office of the Panama Canal Zone.

Pay Inspector B. P. Du Bois after the volcanic outburst at Martinique in 1907, the late Paymaster Byron D. Rogers after the earthquake in Messina in 1909, and Paymaster Donald W. Nesbit and other officers after the floods in the Ohio and Mississippi valleys in 1913, administered relief to thousands of distressed inhabitants. While the object sought in each of these undertakings was the same—to convey food, clothing, medical and surgical necessaries, and the means of shelter, to suffering fellow-beings—yet the means of attaining that object were radically different in each case. Each situation demanded the solving of a different and onerous "logistical problem."

At the present time an officer of the corps is a member of the War Industries Board; other officers are engaged on special duty abroad or on other special duty not proper to be specified at this time.

A realization of the varied accomplishments of the pay corps was agreeably expressed by the late Major General Frederick Funston when he made a request upon the commander-in-chief of the Atlantic fleet for an officer to handle the fiscal affairs of Vera Cruz: "I would like to have an officer of the pay corps of the navy, because I know those officers are not only men of money—they are men of affairs."

It is, perhaps, not necessary to describe the present interior structure of the Bureau of Supplies and Accounts—it may be sufficiently indicated by the implications contained in the foregoing outlines of duties of officers of the corps.

It is necessary to say that for the administrative officers of the bureau to be able to sustain their structure they must have—among other things—a wide knowledge of market conditions in order to purchase materials at the most economical times. They must have the resolution to make decisions to expend large sums of money with the risk of a falling market. They must have the skill and experience to estimate the probable rate of consumption of materials, allowing for casualties, deterioration and waste. They must be ready at all times for the instant acceptance of the heaviest possible responsibilities. The courage necessary to make such decisions and to accept such responsibilities is precisely of the same quality as that required of the commander-in-chief of a fleet when he gives the order to execute a maneuver whose faulty execution may lead to disaster.

At all times in the past the Bureau of Supplies and Accounts as an administrative entity has met exacting requirements. In the present time, it is giving ample illustration of its ready acceptance of responsibility: without delay, without friction and almost without publicity, it has expanded its activities to meet the situation presented by the present war.

It has made purchases of tremendous value; has accumulated great supplies of materials; has many times increased the amounts of its issues of such materials. It has outlined the building requirements for, and, through the medium of the Bureau of Yards and Docks, has now in course of construction various storehouses of large size at different navy yards and at other places. It has established *ab initio* a system of district supply departments and district disbursing offices for the handling of coast patrol matters. It has taken over the supply side of the transport service that is to place the army over seas. These accomplishments are obvious to any chance observer. Of accomplishments designedly less obvious on account of their relation to the war, it is, perhaps, not proper to speak.

It would be impossible for the bureau to conduct such matters as have been outlined without having at immediate command some fund of legal knowledge upon which to draw. As a matter of fact

several officers of the corps—including the present paymaster general—are graduate lawyers, and as such are able to be of substantial service.

In a word, the Bureau of Supplies and Accounts as an administrative identity stands now—as it has always endeavored to stand—fitted to handle whatever exigency arises.

XIII

It seems, then, proper to inquire how officers of the character and ability necessary to carry on its duties are obtained by the pay corps.

Officers of the corps are made fit to endure their inevitable responsibilities as such by a long and severe course of training prior to their being commissioned in the navy. This apparent paradox will at once be seen to be the merest fact if one realizes that the period of a man's life running from 18 to 24 or 25 years of age passed in college or in business after college affords him opportunity for a training for pay corps duties—*i. e.*, business administration—fully equal to the training for the line officer as acquired at the Naval Academy.

It is particularly between the ages of 16 and 21 or thereabouts that a man's predilections as well as his character take shape. Then, or shortly thereafter, he acquires the education and develops the inclination that determine the course of his future life-work. If this period of his life be passed at the Naval Academy, he is graduated therefrom an accomplished technician—but assuredly not particularly equipped to become an administrator of business affairs. On the other hand, if this period be passed at a university, he emerges therefrom with a broad and firm foundation for business; while if some of the following years have been passed in the midst of actual business operations he is just so much the more fortunate. In college, as in a wider field, he has imbibed something of the spirit of "affairs" which is necessarily denied the man whose formative years have been passed at the Naval Academy. Thus, the officer of the pay corps entering the navy from civil life is better fitted for the very duty which he performs than if he had been graduated from a school of naval technology.

The assurances of his fitness to join the goodly fellowship of the navy, and hence of his fitness to serve the nation, that the navy requires of the candidate for a commission in the pay corps is his

passing of a rigorous mental and physical examination. The severe test given to candidates is proof positive that those who pass it have possessed, throughout a considerable number of years, the stability of character and the tenacity of will, as well as the opportunity, to secure a sound general education. Hence, the fact that a candidate has acquitted himself with credit in the examinations constitutes a very reliable promise that he will be ready to meet and fitted to endure whatever responsibilities his career as an officer may demand of him.

The above advantages of a high standard of examination may be a truism to business administrators in civil life not less than to the psychologist; but the significance of this standard has not always been understood by officers in other branches of the navy. It is a reason for congratulation both to the navy and the nation that successive Secretaries of the Navy have always recognized the absolute necessity of maintaining an unflinching proof of a civilian's fitness to become an officer of the corps.

It is a glory of the pay corps as of the navy as a whole that its officers come from all walks of life to meet on a plane of integrity and ability. Of its 446 members, about 65 per cent are college men. Of the remaining 35 per cent, a part is made up of graduates of the Naval Academy or of men who have attended that institution for a longer or shorter period, a part of men who have won their commissions from the corps of pay clerks or from the ranks of the navy at large—the remainder have come from all sections of the business and professional world. A number of the officers of the pay corps were honor men at their respective colleges; others were distinguished as athletes; and nearly all were promiment in extra-curriculum activities.

XIV

If either of the two groups for which this sketch has primarily been written—the younger officers of the line and the newly commissioned officers of the pay corps—has had the patience to read so far, it will doubtless feel that the corps stands supported by a pride in itself that it feels to be justified, ready to meet the problems of the present war and of the future.

That difficulties have had to be overcome no officer with a knowledge of naval affairs will deny. To say that constant study of its profession and assiduous practice in it are necessary to maintain

its standard is only to declare that for the pay corps as for the navy as a whole to rest content with what has already been accomplished is to decay. To acknowledge that the officers of the line who exercise command in battle have every right to expect the ablest possible performance of duty from the officers of the pay corps who supply the means to conduct the battle, is only to express a belief that as the pay corps gives its full measure of devotion to all other corps so it receives its full measure in return.

Unflagging devotion and unyielding honor are the heritages of every naval officer. But, perhaps, in addition, the pay corps possesses something more than its share of a hearty zeal for real usefulness to the navy, a zeal intensified by its realization that its feeling of usefulness is the corps' best reward for the performance of duty that must almost always be conducted without the applause of the world at large. The pay corps stands, then, in the confident hope that its traditions of ability, energy, integrity, service to the navy, and service to the nation, will be maintained.

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

WAR AND AERONAUTICS

By Wm. E. Beard

On one afternoon late in the month of May the inhabitants of the capital city of a certain warring government, by looking northward, might have seen, if they occupied advantageous viewpoints, one of the enemy's aircraft at no great distance away.

Had this particular capital city been London, or Paris, or Rome, and had the time been the present, the appearance of an airship of an enemy on the horizon would have been a signal for a general scramble for storm cellars in the expectation of a shower of bombs, for this particular airship was just 4 miles away in an airline.

Fortunately for the onlookers in the city, their homes were not located in any of the allied capitals, and the time was more than half a century removed from the double tragedy in Sarajevo. There was no rush for storm cellars and no bursting of bombs. The only explosions incident to the appearance of the aerostat, in fact, were the discharges of cannon aimed at the intruder; and fortunately for the airman, the incident under discussion antedated by many years the development of aerial guns and gunners, so that he too entirely escaped injury. The only result of the aircraft's appearance so near the enemy's stronghold that May afternoon, so far as history records, is the following dispatch:

May 27, 1862.

Gen. A. A. Humphreys:

Ascended at 4.45 p. m. one mile from Mechanicsville and I should judge, four miles from Richmond, in an airline. At 5 o'clock three batteries opened upon me, firing many shots, some falling short and some passing beyond the balloon and one over it, while it was at an elevation of 300 to 400 feet. A battle is going on about four miles distant; heavy cannonading and musketry. I will go up again and report.

T. S. C. Lowe.

Brigadier General Humphreys was then chief of topographical engineers of the Army of the Potomac and the day before had been given direction of the balloon department.[1] Prof. Thaddeus S. C. Lowe was chief of the balloon corps of the army. The date and places mentioned identify the incident with General George B. McClellan's Peninsular Campaign against Richmond.

Military aeronautics in the Sixties was a very different proposition from military aeronautics in 1917. There was no bomb dropping then, no duels in midair, no flights overseas to bombard an enemy's cities. The Civil War airman was generally let up in his balloon 1000 feet or so and, while stout ropes anchored his gas bag to the earth, he or those accompanying him made observations of the enemy's movements, or the topography of the country ahead, or even made photographs. However, even this comparatively modest scope of duty involved risks. There was always a chance that a shell luckily aimed would tear the balloon to pieces and the balloonist be dropped to destruction, for it was to be expected that as soon as the aerostat rose above the friendly tree tops the enemy's batteries in range would promptly make it a target.

What was done at Washington in 1861 toward the promotion of military aeronautics becomes of peculiar interest now in view of the vast importance attached in many quarters to the airplane in connection with the United States' part in the world war. Rear Admiral Robert E. Peary has expressed the belief that the aeroplane will prove the deciding factor in the war. Administration bills introduced early in July carried an appropriation of $639,000,000, and contemplated the construction of 22,625 aeroplanes the first year. The President himself has written Newton D. Baker, Secretary of War, strongly endorsing the production of aircraft and the training of men to operate them. If the signs are read aright, this country will soon be mistress of the air, and more pronouncedly so than England is mistress of the sea.[2]

[1] Military aeronautics did not become a part of the work of the Signal Corps of the army until 1892.

[2] On June 22, 1917, the following letter from President Wilson to Newton D. Baker, Secretary of War, was made public: "I have your letter of yesterday about the production of aircraft and the training of men to operate them and want to say that I am entirely willing to back up such a programme as you suggest. I hope that you will present it in the strongest possible way to the proper committee of congress."

The attitude of official Washington toward military aeronautics in 1861 was quite different, though as recently as the battle of Solferino in 1859 balloons had been used to good purpose by the French. Washington did manifest interest in the airmen it is true; there were some interesting experiments and some marked advances made, but there was uncertainty and hesitation on the part of officials which must have tried the patience of the aeronauts who were only too anxious to serve the government. Three men whose names have places in the history of aeronautics were competitors for the honor of heading the balloon department. They were Professor Lowe, John Wise and James Allen.

Professor Lowe was a practical scientist of note, a New Englander by nativity, born in Jefferson, N. H., August 20, 1832. Among the achievements accredited to his long and useful life is the manufacture of ice, he having been the pioneer maker of artificial ice in this country.[3] He died at Pasadena, Cal., January 16, 1913. Lowe observatory located upon a peak of the Sierra Madre mountains perpetuates his name.

Wise was a Pennsylvanian, a veteran airman and pioneer parachute adventurer, whose life was subsequently lost, supposedly in Lake Michigan, following an ascent at St. Louis on September 28, 1879.[4]

Allen was a Rhode Islander who became one of Professor Lowe's most valued assistants and who after the war entered the service of the Brazilian Government when that country, Argentine Republic and Uruguay were at war with Paraguay.[4]

Just prior to the outbreak of the Civil War, Professor Lowe's attention had been centered upon the idea of sailing in a balloon across the Atlantic. With the endorsement of 16 citizens of Philadelphia, he sought financial aid of the Smithsonian Institution. Reporting upon the project, Professor Joseph Henry, Secretary of the Institution, did not recommend the appropriation of any institution funds to the enterprise, but he did express the belief that a balloon of sufficient size and sufficiently impermeable

[3] Taken from a sketch of Professor Lowe in Who's Who in America, 1908-9.

[4] Sketches of John Wise and James Allen are to be found in the National Cyclopædia of American Biography. In Series 3, Volume 3, War of the Rebellion Official Records, is an interesting letter from Allen to Professor Lowe, paying tribute to the latter's work as chief of the balloon corps of the Army of the Potomac.

to gas to maintain a high elevation a long time would be wafted across the ocean, the fact having been established that no matter the direction of the wind near the earth's surface, the prevailing current in an upper region would be eastward. In accord with a suggestion made by Professor Henry, Professor Lowe in April made a long distance inland flight as an experiment, ascending at Cincinnati at 4 a. m., April 20, 1861, and alighting on the South Carolina coast at 1 p. m., having traversed the intervening 900 miles in nine hours.[5]

When he went to Washington on June 5 to offer his experience to the government, young Lowe met with both competitors and discouragements, but through the persevering kindness of the Secretary of the Smithsonian Institution he succeeded in impressing the authorities with the value of his balloon as an aid to the army. On June 21, he received an order from Captain A. W. Whipple, of the topographical engineers, to report with his aerostat at Arlington. The next day the big gas bag was inflated at the works of the Washington Gas Company and towed across the Long Bridge to the Federal camp. The matter was not finally settled, however; as late as August 2, 1861, Secretary Henry was writing Captain Whipple again urging him not to abandon the idea of using war balloons. In the meantime the first battle of Manassas had been fought. Owing to the uncertainty as to whether Lowe or Wise was to be balloonist, it was the evening of July 21 (the date of the battle) before the former finally had his balloon inflated and was started on the way to Virginia. At Falls Church he received news of the disaster to McDowell's army. An aftermath of Manassas was the alarming rumor that the Confederates were marching upon the national capital, and in this connection Professor Lowe rendered a public service to the people of Washington. On July 24, he took a flight in his balloon to investigate the basis for the wild rumors current. A favorable west wind carried him over the country occupied by the Confederate forces, and having discerned nothing of an alarming nature he mounted to the higher regions of air to be carried home by the perennial east wind. He was carried across the Potomac without misadventure, but when he sought to descend he was greeted with rifle bullets, and shouts to show his colors. Being without a flag he

[5] Series 3, Volume 3, War of the Rebellion Official Records, and Who's Who in America, 1908-9.

was forced to ascend again and finally landed 2½ miles outside the Federal picket line. His observations published the next day served to quiet the excitement in Washington, however much the nerves of Professor Lowe may have suffered while his balloon was being shot at by the defenders of the city.

This was an exceptional use to which the balloon was put; as a general rule the war balloons of the Sixties were not set free, but were safely anchored to the earth by ropes. However, about the time that Professor Lowe's balloon was being made the target of Federal soldiers in Washington, a notable flight for the Federal army was made. John La Mountain, then with General Benjamin F. Butler at Fortress Monroe and later with McDowell (at least his balloon, the Atlantic, was with McDowell), was the man making the flight. Ascending to a height of 3500 feet he sailed over Hampton, Newport News, Norfolk and up the James River, returning to Fortress Monroe with a diagram of the Confederate camps in the vicinity.[6]

Early in August, 1861, the compensation of Professor Lowe, as head of the balloon department, was agreed upon. His pay was fixed at $10 per day; his position carried no military rank.[7] So far all his observations had been made from his own balloon, the one in which he had made the Cincinnati-Carolina flight. On August 2 he was authorized to have a real war balloon constructed. It was to be made of the best India silk and to contain 25,000 cubic feet of gas. Three anchor ropes, 1200 to 1500 feet in length, were included in the specifications. This balloon, according to Professor Lowe, was the first real war balloon ever constructed. By August 28, it was completed and two days later it was in the air betimes, Professor Lowe discovering the Confederate batteries on Munson's Hill and Clark's Hill, sufficiently near to Washington for the southern troops to obtain distant views of the capital. During that afternoon the balloon was moved to Ball's Cross-roads, where cannon balls fired at it fell

[6] John La Mountain's flight was made on August 10, 1861. His report to General Butler is to be found in Series 1, Volume 4, War of the Rebellion Official Records.

[7] The government's original proposition was pay at the rate of $30 a day for each day the balloon was in use for reconnaissance on the Virginia side of the Potomac, according to the letter of Captain A. W. Whipple, which is reproduced in Series 3, Volume 3, War of the Rebellion Official Records.

nearer to Washington than any fired in that direction up to the time of Gettysburg.

During the autumn of 1861, on the recommendation of General McClellan, the Secretary of War ordered Professor Lowe to have four more war balloons constructed. These were christened the Constitution, the Washington, the Intrepid and the Union. One of these was sent to Port Royal, S. C., to cooperate with the command of General Thomas W. Sherman. Later it was used about the mouth of the Savannah River.[8]

The balloon department was more or less conspicuous on a number of battle-fields of the war. The war balloon Eagle was with Commodore A. H. Foote during his attack on Island No. 10 in the Mississippi River in the spring of 1862.[9] There is a suggestion of modern aeronautics in the following reference in Professor Lowe's account of this balloon:

> During the bombardment (of Island No. 10) an officer of the Navy ascended and discovered that our shot and shell went beyond the enemy, and by altering our range our forces were soon able to compel the enemy to evacuate.

In McClellan's Peninsular Campaign the balloonists rendered signal service. It was from a balloon sent up from the Federal camp that discovery was first made that the Confederates had abandoned their works at Yorktown, which barred the way to Richmond. Later, at the battle of Fair Oaks, or Seven Pines, information furnished by a balloonist led McClellan to order General Edwin V. Sumner to rush the construction of a bridge across the Chickahominy and cross his corps to help the troops on the south side of the swollen river at a crucial moment.

It was during this campaign that General Fitz-John Porter had his thrilling adventure in the air. From the Federal camp before Yorktown he had himself let up to make observations and the rope, anchoring the balloon, having been eaten by acid, parted. Word was quickly carried to McClellan that the balloon had

[8] J. B. Starkweather, of Boston, was the aeronaut with this balloon.

[9] In the abstract of the log of the Mortar Division of the U. S. Western Flotilla, March 14 to April 10, 1862, occurs this reference to the balloon:

"March 25.—At about 3 p. m. balloon ascensions were made in Captain Steiner's balloon Eagle, to the height of 500 feet. The day being hazy they could not define fully the position of the enemy, but the experiment proved satisfactory."—Official Records of the Union and Confederate Navies in the War of the Rebellion, Series 1, Volume 22.

broken away and had come to earth 3 miles distant, which meant that the landing had been made within the Confederate lines. The commander promptly sent out to the pickets to ascertain the facts and prepared to make a demonstration hoping to rescue his subordinate. Just about that time Porter walked into headquarters, a vagrant air current having brought the balloon back into the Federal camp after a voyage over the enemy's lines.

No less than three war balloons were used in the Peninsular Campaign, which campaign was the high water mark of military aeronautics during the war.

The balloon corps also saw service at Fredericksburg on December 13, 1862, when General A. E. Burnside commanded the Army of the Potomac.[10] On this occasion General Burnside ordered the balloon kept in concealment until the day of the battle. Early in the morning of that bloody day ascensions began, the balloon's station being directly over the general's headquarters. Several times the Confederate cannoneers took shots at it, and one cannon ball, which passed very close to it, fell 2 miles beyond it, the elevation of the gun having carried the missile over 3 miles. In striking contrast to the present day reliance placed upon aircraft for scouting purposes, it is pertinent to mention that critics of the battle of Fredericksburg have vigorously condemned Burnside for making aeronauts instead of cavalry his dependence in securing information.[11]

When the battle of Chancellorsville was fought early in May, 1863, there were two balloons with the Army of the Potomac, the Eagle and the Washington. The others on April 17 had been sent to Washington for repairs. One of the two remained in the vicinity of Fredericksburg when General Hooker launched his great flanking movement. The other was carried to Banks' ford

[10] The Fourth Maine Infantry, Colonel Elijah Walker, furnished the detail, an officer and 30 men, to assist the balloonist at Fredericksburg. Series 1, Volume 21, War of the Rebellion Official Records, Colonel Walker's report.

[11] Steele's "American Campaigns" says: "'His balloon,' says Colonel Henderson in his life of Stonewall Jackson, 'had reported large Confederate bivouacs below Skinker's Neck, and he appears to have believed that Lee . . . . had posted half his army in that neighborhood.' Colonel Allan remarks: 'He appears to have relied chiefly upon his balloons—a wretched substitute at best for scouts and cavalry, and especially so in a broken and heavily wooded country.'"

of the Rappahannock River. It was at Chancellorsville on May 2, it will be remembered, that " Stonewall " Jackson, before receiving his death wound, marched a large part of the Confederate Army across the Federal front and fell at sundown upon the unsuspecting right wing of Hooker's army—rather a poor showing at first glance for the balloon corps. The following exchange of messages between Professor Lowe and General Hooker's chief of staff may serve to exonerate the balloonist, however:

May 2, 1863, 12 m.

Prof. Lowe:

Why is not the balloon up, and why do we not hear from it?

DANL. BUTTERFIELD, Major-General.

12.30 p. m.

Major-General Butterfield, etc.:

General, I have made several efforts to ascend, but found the wind too high and could not use the glass. It is getting calmer now, and I will try again.

T. S. C. LOWE.

May 2, 1863, 1.05 p. m.

The enemy remain the same opposite this point, and no movement is visible on any of the roads seen from the balloon. The wind continues so flawy that the balloon was blown from a thousand feet elevation to near the earth.

T. S. C. LOWE.

Observations taken the next morning from the balloon near Fredericksburg were more fruitful. Ascending there about 7 o'clock Professor Lowe reported the Confederate line very thin opposite his point of observation and especially so immediately in the rear of Fredericksburg. The Federal troops were concentrated and at 11 o'clock the weakest point was assaulted and carried.[12] The last fruitful ascents were in this connection—the attack of Sedgwick upon Marye's Heights. The heavy storm of May 5 and 6 caused the loss of all the gas in one balloon and some of the gas in the other. Ten carboys of acid and four barrels of iron trimmings were also destroyed. On May 7, Professor Lowe retired from the service.

[12] Professor Lowe assumes in his account that his observations were responsible for the discovery of the weakness in the Confederate line. General William Barksdale's report of the fighting on Marye's Heights attributes this discovery to the improper reception of a flag of truce sent over by the Federals to ask a truce for the removal of the wounded. Barksdale commanded a Mississippi brigade; he lost his life at Gettysburg.

On April 7, 1863, Captain Cyrus B. Comstock, Corps of Engineers (the late General Comstock, of New York), had been assigned to the immediate direction of the balloon establishment by order of General Hooker. Friction between the new commander and Professor Lowe developed early. In less than a week Captain Comstock proposed to eliminate from the balloon corps Clovis Lowe, the chief's father, and John O'Donnell, and to reduce Professor Lowe's pay from $10 to $6 per day. Professor Lowe wrote an aggrieved letter to General Butterfield, Hooker's chief of staff, announcing that it would be impossible for him in justice to his family to serve at the proposed figure, but promising to lend his best efforts toward making a success of the next battle, which proved to be Chancellorsville. The promise was kept, and when the battle was over he left the service. According to his own account, he received no pay for the last month of his service, nor did he prior to the order for the construction of the original war balloon which went into commission on August 30, 1861. Several writers of the war period have given him credit for working indefatigably by night as well as day in carrying out his contract with the army.[13]

Military aeronautics in Civil War times reached the highest state of development during the time that McClellan commanded the Army of the Potomac. With the retirement of Professor Lowe as chief of the corps, the war balloons seem to drop out of

[13] At the time he severed his connection with the balloon corps, Professor Lowe addressed a lengthy communication to Secretary Stanton, in the nature of a protest at the treatment which brought about his retirement. This communication takes up 70 pages in Series 3, Volume 3, War of the Rebellion Official Records, and furnishes the basis for this account of military aeronautics in Civil War times. Observations of Professor Lowe's work with the Army of the Potomac, recorded by Colonel Beaumont, of the Royal Engineers of the English Army, reproduced in "Travels in Space," E. Seton Valentine and F. L. Tomlinson, throw some light on the devotion which Professor Lowe gave to his duties. "The balloon staff with McClellan," says Colonel Beaumont, "consisted of one chief aeronaut whose rank I could never quite make out, but it was not lower than a captain nor higher than a brigadier; he was a civilian and by profession an aeronaut; he was very highly paid, the same as a brigadier. . . . . At any rate he was a very clever man, and indefatigable in carrying out his work. By night or day, whenever the weather gave a chance of seeing anything, he was engaged on his observations," etc.

the official records of the war, or nearly so.[14] At the time Burnside succeeded to the command of the army the balloon corps represented a highly advanced department as things went in those days. The corps then possessed the following apparatus:

Six balloons with portable gas generating apparatus by which one of the balloons could be inflated at any place, sufficiently to raise two men and the anchoring ropes a thousand feet or more, in three hours time.

A telegraph train with five miles of insulated wire permitting reports to be telegraphed directly from a balloon in air to the headquarters of the commanding general.

A lighting apparatus producing a powerful oxy-hydrogen or calcium light by means of which a force of two thousand men could work at night as well as by daylight.

Powerful magnifying lenses by which photographs of three inches square could be magnified to twenty feet square.

A set of small signal balloons for use during either day or night, to which fires of red, white, green, or blue could be attached, burning ten times as long, with greater brilliancy and costing no more than rockets.

The balloons were kept inflated from one to two months without a change of gas, and when in commission were ready for an ascent on five minutes notice.[15]

Among the aeronauts connected with the balloon department at various times were Professor Lowe, James Allen, E. S. Allen, J. B. Starkweather, Clovis Lowe (the chief's father), Captain E. Seaver, John O'Donnell and William Paulding. During the days when the balloons were in active use many of the generals took advantage of the opportunity to make ascents in them and observe the positions and movements of the Confederates. Among the

[14] An interesting reference to the Federal war balloons, appearing subsequent to Professor Lowe's retirement, is to be found in the following dispatch to General G. T. Beauregard's chief of staff at Charleston, recorded in Series 1, Volume 35, Part 1, War of the Rebellion Official Records:

MOUNT PLEASANT, (S. C.), January 25, 1864.

Brig. Gen. Thomas Jordan:

I have information that balloons have gone up for the last three nights from Capers' Island; they have not gone up in the daytime. The object must have been to discover camp-fires. I have given directions to insure their seeing a number of them after to-night, and shall commence rocket practice. Shall also send a reconnoitering party in that direction.

R. S. RIPLEY, Brigadier-General.

[15] The apparatus given here was enumerated in a letter addressed by Professor Lowe to Major General John G. Parke, General Burnside's chief of staff, November 20, 1862. The letter is to be found in Series 3, Volume 3, War of the Rebellion Official Records.

number were Generals Irvin McDowell, McClellan, Daniel E. Sickles, Stoneman, Heintzelman, Fitz-John Porter, Daniel Butterfield and the Comte de Paris, who was an aide on McClellan's staff at the time. Another foreigner with the Army of the Potomac as a military observer was Count Zeppelin; and it is said that the father of the dreadnought of the air obtained valuable ideas on military aviation by watching the operations of the balloon corps of the Army of the Potomac.

In comparison with the well-equipped balloon department of the Army of the Potomac, the efforts of the Confederates in aeronautics were scarcely deserving of technical consideration. A war balloon which they made use of during the Peninsular Campaign was a very crude affair—a great cotton bag treated to make it impervious to air, and inflated with hot air derived from burning pine knots and turpentine. General Joseph E. Johnston brought it down from Richmond when he came to the relief of General J. B. Magruder, who had entrenched the Peninsula at Yorktown. Several ascents in this balloon were made by John Randolph Bryan, a young member of Magruder's staff. Some observations that were of value were made from this homely airship. At least one ascent in it was a highly thrilling adventure for the young aeronaut.

Just before the Confederate Army fell back from Yorktown, according to Mr. Bryan, the Confederate balloon squad was waked in the middle of the night with an order to heat up the aerostat for an ascension to discover the direction in which Federal troops were moving. The young aeronaut—he had made but two ascensions before—counted himself lucky in making a night instead of a day trip, expecting to escape the Federal gunners the better. The preparations for the ascension began satisfactorily enough for the occupant of the balloon basket.

However, a balloon ascension was a novel spectacle for many of the southern soldiers; every time the great cotton bag was inflated large numbers of them assembled to watch the proceeding. On the occasion of this night ascension a crowd of curious soldiers gathered about the balloon squad, intently following each detail of the preliminaries. The balloon had been let up to an altitude

of about 400 feet when one of these intent bystanders, heedless of where he planted his feet, inadvertently stepped into the coil of the anchor rope and was directly being whisked toward the windlass by means of which the balloon was raised and lowered. The fellow yelled promptly and lustily, and a comrade, seizing an axe, severed the balloon rope with a blow—and away went the balloon!

The balloon's leap upward, a distance of about 2 miles, as it seemed to young Bryan in the car, left the latter breathless and sick. Finally, though, the balloon climbed no higher and the condition of the passenger began to improve; he began to think of his probable fate. One possibility was that the balloon might be blown out into Chesapeake Bay; another was that the balloon might descend within the enemy's lines and the balloonist be captured and treated as a spy. The hot air in the bag began to cool and the balloon began to descend. Capture seemed the certain fate of the balloonist, for his airship drifted from over the Confederate camp across the Federal lines. Further and further, the big cotton bag settled, and finally Bryan's heart began to beat hopefully—another current of air had begun to waft it back over the Confederate lines. The young balloonist's satisfaction, however, was short-lived; the Confederates camped below mistook him for an enemy, and the soldiers—the regiment was the Second Florida—began chasing the balloon and shooting at it. Then once again an elfish current of air took the balloon in charge and blew it out over the York River, 3 or 4 miles wide at that point. The prospect now was that the balloon would end its career in the river, and Bryan stripped off his clothes in expectation or having to swim for his life; his boots being fashionable and tight fitting had to be ripped off. When the balloon rope was dragging in the river, the wind veered still again and the young aeronaut came to earth in an orchard, where he made his airship fast, borrowed a horse, and dashed off to General Johnston's headquarters, 6 or 8 miles away, to make a report of the observations he had managed to make in spite of the thrills of various character experienced during the expedition. It was young Bryan's last ascension, General Johnston after receiving his report allowing him to return to his

post at Magruder's headquarters.[16] The Confederate balloon, however, was in service as late as the battle of Gaines' Mill on June 27.[17]

In several departments of the science of war, the Confederates were notable for the innovations which necessity forced them to develop to compete with the superior equipment and resources of the enemy. Military aeronautics does not seem to have been one. It was the North which set the pace in aerial operations. The Federal balloons corps was responsible for a very material advance in the matter of inflating balloons, the gas necessary being generated wherever wanted and the time of inflation greatly reduced. The balloons of the aeronaut corps of the Army of the Potomac, it was claimed, ascended four times as high as balloons (with ropes) had ascended before. On June 18, 1861, it is recorded that messages were sent by telegraph to the earth from a balloon in air, one of the first such messages going to President Lincoln from a balloon 1000 feet above ground. On November 11, 1861, the first balloon expedition by water was successfully carried out, the scene being the Potomac River at the mouth of Mattawoman

[16] Captain Bryan's account of his experiences as balloonist of the Army of Northern Virginia is to be found in the *Confederate Veteran* of April, 1914, reprinted from the Richmond, Va., *Times-Dispatch*.

[17] Mention of the Confederate balloon is made in the following dispatch from Professor Lowe, recorded in Series 3, Volume 3, War of the Rebellion Official Records:

June 27, 1862, 9.20 a. m.

Brigadier-General Humphrey, or General Marcy, Chief of Staff:

Although I reported myself ill on this occasion I will remain constantly in the balloon, and if you will send me two orderlies I will keep headquarters constantly informed of what can be seen from the balloon. My assistants that you speak of are trying to save the property in their charge. In an exact north direction from here, and about two miles and a half from the river, in an open field, there are large bodies of troops, but I should judge they were too far down on our right to be the enemy. On a hill this side of Doctor Gaines' house there is a long line of skirmishers stationary. On the field near where General Morell was camped everything is on fire.

About four miles to the west from here the enemy have a balloon about 300 feet in the air. By appearances I should judge that the enemy might make an attack on our left at any moment. We are firing occasional shots on our left.

T. S. C. LOWE.

Creek.[18] Should the present efforts result in making the United States preeminent in the air one might in all justice say that it is but another instance of history repeating itself.

[18] The account of the first balloon expedition by water is found in a report made by Professor Lowe to Lieut. Colonel A. V. Colburn, of General McClellan's staff, recorded in Series 3, Volume 3, War of the Rebellion Official Records, as follows:

Navy Yard,
WASHINGTON, D. C., November 12, 1861.

Lieutenant-Colonel Colburn:

DEAR SIR: I have the pleasure of reporting the complete success of the first balloon expedition by water ever attempted. I left the navy-yard early Sunday morning, the 10th instant, with a lighter (formerly the *G. W. P. Custis*) towed out by the steamer *Coeur de Lion,* having on board competent assistant aeronauts, together with my new gas generating apparatus, which, though used for the first time, worked admirably. We located at the mouth of Mattawoman Creek, about three miles from the opposite or Virginia shore. Yesterday I proceeded to make observations, accompanied in my ascensions by General Sickles and others. We had a fine view of the enemy's camp-fires during the evening, and saw the rebels constructing new batteries at Freestone Point. I was under the necessity of returning for some necessary articles this morning, and will go back immediately to continue in person the reconnaissances.

After making all necessary arrangements below, and leaving a competent aeronaut and assistants in charge, I shall return and place the other balloons wherever the general desires them. I have now a competent aeronaut for each of the new balloons, and in the course of a few days they can all be in active operation.

I will call and see you on my return.

Your obedient servant,
T. S. C. LOWE, Aeronaut.

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

STONEWALL JACKSON FROM A NAVAL VIEWPOINT

By Lieutenant Commander C. B. Mayo, U. S. Navy

It may seem a far cry from the battlefields of Old Virginia to the broad Atlantic, the probable scene of future battles for our service, but whether on dusty road and lofty mountain or on the heaving main, the qualities of leadership essential to victory remain the same. Daring founded on a careful weighing of chances; whole-hearted initiative with subordination to the general plan; decision and unwavering adherence to that decision; unfailing industry and devotion to duty with its attendant subordination of self; and judgment matured by years of study of the great captains, their battles and their campaigns still and will ever remain the requisites for victorious leadership.

The great Virginian was made great only by his own efforts. He was no Heaven-born leader endowed with transcendent genius; no youthful Alexander nurtured in a very cradle of war; no Bonaparte with opportunity ready at his first youthful call amid the chaos of a revolution. He was a simple American country lad somewhat handicapped by lack of early family care, delicacy of health and residence in a backwoods community.

The studiousness which placed at his command great military qualities was not evidenced in his early years; he was the average boy with the tastes and pursuits of the normal country lad. Not until he entered the Military Academy did he show to an unusual degree the fixity of purpose and unswerving loyalty to an idea, which, in after years, played so large a part in his success. It may be worthy of note that Jackson was no bookworm who pursued his studies for the mere inherent love of books; but it is strikingly apparent that he properly used his books solely as means to acquire and retain knowledge to be useful to him in future years. His Scotch-Irish blood showed in his vehement methods of study; he

seems to have tackled each problem almost as a personal enemy, never to be left behind until thoroughly mastered. What Jackson read was absorbed, deeply pondered, and frequently committed to memory, so keen was he in his striving for absolute mastery of his subject and so contemptuous was he of the half-knowledge which at the time would perhaps have been more showy, and by making a better impression in the class-room, have given him a higher daily mark and a better class standing. One can readily imagine what Stonewall Jackson's opinion would have been of a section room "Bluffer." Laboring under great disadvantages of poor early education and of an extremely diffident manner, his class standing at West Point steadily improved year by year. As one of his classmates has said, "If old Jack had had another year he would have led the class."

As a young man Jackson carefully husbanded his physical strength. He was threatened with lung trouble and invariably sat bolt upright in his chair as he studied. By his command of self he turned his physical weakness into an asset, for he undoubtedly forced himself to forego many of the pleasures and excesses of the youth of his period in order that his body might remain strong enough to accomplish the mastery of his profession. In later years Jackson once said that he rarely dared to touch whiskey because he loved its taste so much, but he seldom expressed his views on moral conduct, merely reserving to himself in the selection of his staff the choice of men possessed, to a certain degree, of his own attributes. History shows few such examples of the sterling quality of absolute honesty and abhorrence of deception in any form, whether that of self or of others. The only person who Jackson ever attempted to deceive was the enemy leader, and one must admit he was a past master at that.

The power of concentration which he developed at the great school on the Hudson was undoubtedly of tremendous value to him in his later campaigns, enabling him to hold in his mind not only a vivid mental picture of the arena of the struggling forces, but also to move with absolute certitude his detachments like pawns at chess, for by the unequal numbers of the opposing armies Jackson was often forced to "march divided but to fight united."

Whether ashore or afloat, the leaders of opposing forces move in an ever-present "fog of war," and that leader will win, given anywhere nearly equal forces, who can intelligently weigh and

assign the proper relative importance to the reports which come to him from his sometimes distant intelligence service. It is true in a strategic sense that a "fleet has no flank"; but a recent North Sea engagement has demonstrated that it has lines of retreat vital to its existence, and in this day of tremendous consumption of the material of war, lines of supply have become of great importance.

There is still present the great moral value of a movement with the view of imposing a threat on the enemy capitals and cities, out of all proportion to the purely military value of such movements. Jackson excelled in the "flank attack" (Chancellorsville) in his menace to an enemy's lines of communication and supply (second Manassas); in the use of military movements to impose moral fear on the enemy politicans (the Valley campaign).

The difference in the tactics of sea and land engagements is not fundamental. At sea or on land it is as good tactics to crush a part of the enemy line, while containing the remainder, as it was 500 years before Christ on the field of Marathon. Miltiades had no more apt a pupil than in Jackson at Cedar Mountain. Jackson's seeming daring had no bounds; but what often appeared to be rashness was the result of careful deliberation, hard study of details, and an almost uncanny knowledge of the enemy's "state of mind."

The relation between Lee and Jackson, while never personally intimate, is a perfect example, from the military viewpoint, of the coordination of superior and subordinate. In his particular sphere the subordinate was left to his own devices; initiative was appreciated and applauded; but this very confidence on the part of the superior in the subordinate was engendered by a knowledge that the subordinate would never allow his initiative to interfere with the general plan. That Jackson realized this is evident in his conduct at the conclusion of the Valley campaign.

In his tenacity of purpose Jackson was almost terrible—nothing could stand in his way if victory beckoned. At Sharpsburg he would have dared a counter attack, and he fell while fiercely urging on his men to complete his great stroke at Chancellorsville.

Nelson and Jackson are singularly alike in many qualities of leadership, if not of character. Both were equally daring to snatch a victory; cool and skillful in action; and relentless in pursuit until the enemy was crushed or destroyed. The great sea deeds of Nelson at Cape St. Vincent, the Nile, Copenhagen, and Trafalgar

are recalled to us by the exploits of Jackson at First Manassas, the campaign of the Shenandoah Valley, the Second Manassas, and at Chancellorsville. With Jackson, as with Nelson, their country ever needed a " victory that year." The comparison does not end here; both were beloved by the men under them; both sacrificed self to duty; each was fighting for a cause which he was convinced was just; and though the sailor received his death wound on the deck of his flagship in battle on the sea and the soldier in the thickets of the Virginian wilderness, each died alike in the hour of victory achieved by his splendid leadership. Death brought their military careers to a close at very nearly the same age.

From the quaint figure in dusty, faded uniform and sadly battered cadet cap, sucking his precious lemon as he jogged along on Little Sorrel, every sailor can draw an inspiration. No War College opened its doors to Stonewall, but he carried in his breast pocket two books, a Bible and Napoleon's Maxims. The maneuver board, however, would have had no more devoted a student nor more constant an attendant.

Many years have rolled by since Stonewall Jackson played at the fierce game of war; the partisan passions which raged in the breast of Americans are gone never to return; but his military exploits will never be forgotten amongst the soldiers and sailors of the Republic. No greater tribute could be paid him, and one which he, above all others, would have appreciated, than the inculcation of his doctrines in our hearts and the use of the shining weapons fashioned by his brain against *his* country's enemies.

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

WHAT IT MEANS TO BE AN OFFICER IN THE UNITED STATES NAVY TO-DAY[1]

By H. C. WASHBURN, Instructor, U. S. Naval Academy

Captain Nulton and Captain Hough have given me the honor of addressing you. I have to thank them, not only for this, but for the privilege of choosing my own subject. The subject I have chosen—and I could not choose otherwise—is this: What it Means to be an Officer in the United States Navy To-day.

You have come from civil life to enter the navy. This means undergoing a change in point of view. What does it mean simply to be in the navy, as distinguished from civil life?

First of all, to be a naval officer means, I think, that you have left behind you a *local* point of view, and have acquired, perhaps unconsciously, a *national* point of view. You have ceased to think in terms of your city, your county, or your state; you now think in terms of the nation. To express the real significance of this change more effectively, you have risen out of, and above, and beyond, local vision, to the higher plane of national vision. I am not assuming that as citizens you did not have a broad outlook or breadth of mind; nor am I assuming that naval officers are more broad-minded, in the usual sense of the term, than civilians. But I am assuming a most important thing—namely, that certain federal officials, such as the President of the United States, the justices of the Supreme Court, for instance, and the officers of the army and the navy, by virtue of their *national* position, do habitually think in terms of the nation, and have the privilege of national vision.

To have national vision—the first privilege, as I see it, of the naval officer—is to have something like the advantage of the

[1] An address delivered to the first Reserve Officers' Class at the Naval Academy, July, 1917, and, with modifications, to the second Reserve Officers' Class, November, 1917.

mountaineer over the people who dwell on the plains and in the valleys. The mountaineer sees things in the large and as a whole; he sees things in their due proportion and perspective. Also, as compared with the plainsman, he breathes a higher and a keener air. So it is, as regards national vision, with the naval officer. And again, the mountaineer's point of view is never fully understood by the valley people, because the dwellers in the valley have a restricted, a local horizon; they have probably never risen out of, and beyond, and above, the limitations of their local point of view. Likewise, it has often been difficult for the American people—who have, for the most part, local attitudes of mind—to understand naval officers, and especially to appreciate the absence of militarism and the sincerity of these experts, who, with their broader range of vision—national vision—have seen the clouds of war gathering on the far horizon, and have therefore urgently appealed for a larger navy.

You have acquired this national vision; you are "on the mountain." Now look back. See how much it would benefit the people if all of them could attain national vision. If they could see with your eyes, from where the naval officer stands, they would soon see clearly the far horizons of national and even international affairs, and the need of what the President has recently called "incomparably the most adequate navy in the world."

More and more American citizens are seeing this now, in the midst of the greatest war in history, but with the national vision of the naval officer, they would have seen it *in time of peace*, when, as Washington said, a nation can best prepare for war. What can be done to give the people national vision? There is but one answer to that question: Universal training and universal service with the colors, both for the army and the navy—universal service, so that, as among the democratic citizens of France, the army and the people, the navy and the people, shall be one and the same.

National vision, then. You enter the grounds of the Naval Academy, and you feel at once that this place does not belong to Annapolis, just outside the gates; nor to the state of Maryland; but that it belongs to all the states, 48 of them, one indivisible nation. It is the *United States* Naval Academy. And this national feeling grows still stronger when you become a part of the fleet at sea. You know that curious yet most significant principle of

international law (which the German Emperor told Ambassador Gerard exists no longer), that principle of "exterritoriality," which maintains that the deck of an American man-of-war is, in law and in fact, part of the territory of the United States. Nothing is less local than a warship; nothing American is more national than a United States ship—one of our splendid super-dreadnoughts breasting the seas, her great guns ready to defend the lives and the fortunes of the nation. At her taffrail, the Stars and Stripes, floating in the breeze, free as the freedom of the seas she is there to defend, seem to say, to friend and foe alike: "Here is the nation's power. Herein, lest the people forget, are to be found the hope and the security, the prestige and the honor, of 100,000,000 of people, a free people who mean to remain free—the hope and the stay of a world struggling to make itself 'safe for democracy'—the American people."

Secondly, to be in the navy means that you have taken your place in the first line of defense. This is not a boast, but simply a fact, of which, as naval officers, you can be proud. Defense, of course, really means "offense." The former is a term used naturally by the people ashore, who see in the navy their defense against invasion; the latter is the naval officer's term, since "the best defense," as Farragut remarked, "is a well-sustained fire directed at the enemy's guns." In other words, the only sound doctrine of war concerns itself with the offensive. Yet it is literally true, considering the object to be attained by naval offensive operations, that the navy is indeed our first line of defense. You may say that our frontiers have been thrust eastward for more than 3000 miles—that in fact our frontiers coincide with the lines of the American Army, "somewhere in France," under General Pershing. But when you have said this, you have increased by just so much the significance of the words: the navy is our first line of defense. Every transport carrying troops, carrying supplies to those troops, and munitions, must be guarded by the navy—convoyed by the navy. The more powerful our expeditionary force, the more vitally must it depend upon the navy. If I mention such obvious things, it is because we are apt to forget the full significance of the obvious, or take it too much for granted. For it is equally obvious, yet certainly not fully appreciated, that our frontiers also lie over the North Sea and the Channel—at every point, in fact, where our gallant and cruelly over-worked destroy-

ers dash headlong in chase of German submarines. Our frontiers lie also on the decks of armed merchantmen, and our frontiers are pierced and raided in precisely the measure of our merchant shipping losses, when our merchant sailors and naval gun crews are killed or taken prisoner—heroes mostly nameless to reward or fame in the public consciousness. And right here let us recognize and be grateful for the fact that the British Grand Fleet and the fleet of France are also America's first line of defense. Cannot some Americans forget, in the face of this, wars with Great Britain now a century and more buried?

In the third place, but not least, to be in the navy means the opportunity to *grasp*, to "read, mark, learn, and inwardly digest," the value of sea power—the influence of sea power upon history. Merely to use this phrase, this title of an epoch-making book, is to summon up the name of an American naval officer, Admiral Mahan, a prophet not without honor in his own country, but a genius whose message has been more highly regarded and its profound significance more clearly understood in Europe than in the United States. Mahan saw, as no other man, how the influence of sea power has been exerted upon the history of nations for centuries past, from the days of Salamis on down to our own days of Tsu-Shima. He placed a new interpretation upon history. Much of history is forgotten. Much is seen, even by historians, with eyes that see not. It remained for Alfred Thayer Mahan to become the philosopher of sea power. His first book, published in 1890, acquired sudden and widespread fame—but not popular fame, for its deep meaning existed mainly for a limited number of men, naval officers and a few statesmen. The Emperor of Germany was fascinated by that book of lectures given at Newport, U. S. A. For months he slept with it under his pillow. It was then, inspired by Mahan, that William II dreamed his dream of German naval supremacy in the future. It was not long afterward that he said for the first time: "The future of Germany lies on the sea." The result of that ambition, instilled by von Tirpitz through the German Navy League into the hearts of the German people, was the German high seas fleet of to-day. If that fleet could stay at sea for two weeks, the war would be over. It is not sufficient even to keep it landlocked. It is still a powerful "fleet in being," and it still protects, potentially, the German submarine bases.

The unfortunate difference between Trafalgar and Jutland is twofold. Trafalgar was decisive; Jutland was not. Not ultimately so. Moreover, Napoleon Bonaparte had no submarines. The submarine campaign of Prussia, however barbarous as piracy and murder, is, nevertheless, sea power, and no less powerful because ghastly in its evil. It is still true, therefore, despite Jutland, despite the seven seas of the world which know not German trade, that the ultimate decisive factor in the greatest of all wars is sea power.

You have indeed the opportunity to grasp the importance of sea power, the "power to decide," because you will help to make that vast decision. What shall be the answer to this menace? There are rumors of a great swarm of airplanes. A new power, air power, is taking form and shape. Air power we shall have, and no man can tell its possibilities. It is at this very moment a necessary part of sea power. But sea power is still supreme, whoever wields it. The answer to the submarine must be found, ultimately, in *some* use of sea power. And by that power we and our allies shall stand or fall.

The German Crown Prince has said that the submarine is "the last argument of kings." *Ultima ratio regum*—thus runs the old Latin watchword of royalty. You will find it engraved on the beautiful bronze cannon, just outside this hall—seventeenth century cannon which symbolize the splendors of the former empire of Spain, before Spain's Invincible Armada met the sea power of England, and again, before Spain lost her modern empire, when she met the United States Navy. "The last argument of kings?" What, then, must be the last argument of democracies? What else but the fleets of our allies, and, let us say it with all modesty, that reinforcement of ours without which the true answer to the submarine has not been found—the navy of the United States? If the world is to be made "safe for democracy," there must be a predominance of sea power controlled by great democracies. It is the privilege of the naval officer to see these things, not "as through a glass, darkly," but "face to face." He would gladly bestow such an advantage upon all his countrymen.

All of this it means to be in the navy—to have national vision, to be in the first line of defense, to grasp the importance of sea power. What does it mean more definitely to be in the United States Navy?

To be in the United States Navy means, first, to learn our own type of naval discipline. Discipline in the American Navy is something individual. It is peculiar both to our own navy and to our own people. On the one hand, the navy must be a law unto itself. "I believe in free speech," said Wellington, "but not on board a man-of-war." Russia is learning that lesson. On the other hand, a navy is and should be influenced by the character and the customs of its own people ashore. In one sense, then, the sense of authority, our naval officers must be autocrats. In another sense, the sense of attitude toward their subordinates, they must be democrats. Here is a combination not always understood by people who are not in the navy. The navy regulations would enlighten them; but people do not read the navy regulations. As a matter of plain fact, there is many a business man in civil life who is more of an autocrat than a naval officer would think of being. That is one of the reasons why there are "strikes" in civil life, but no strikes in the naval service of the United States—in other words, no mutinies. You cannot successfully *drive* an American citizen worth his salt, not the kind wanted in the navy. You can lead him, and you must lead him. The principal basis of American naval discipline is not fear, therefore, but *leadership*.

This discipline, autocratic as regards obedience, democratic as regards method, is magnificently adapted to American character. It is as firm as steel, but it has the give and take of tempered steel. It has an immense capacity for overcoming certain faults that are peculiarly American faults, such as the failure to understand the necessity of immediate and unquestioning obedience to constituted authority, and the tendency to assume that because "all men are created free and equal" it is a species of slavery to put yourself under the command of duly constituted authority, or to salute your senior in rank. The American is apt to forget that the officer he salutes must himself salute his own seniors in rank, and that the salute itself is the outward and visible sign of an inward and essential organization which must have a bottom as well as a top.

American naval discipline also has a great capacity for making the fullest use of the finest elements of American character: self-respect, personal pride in work performed, team play, the instinct for competition, and sportsmanship. The American naval officer thus follows, unconsciously, the traits of his "logical ancestor," the British naval officer; yet his discipline differs from British

discipline. For instance, the British custom whereby an officer, before addressing his crew, gave the order: "On your knees," was a defensible order, in that it enabled the officer to see the faces of all the men to whom he spoke. But such an order, for reasons clear yet hard to define, would be "unheard of" in our service. The best type of officer in our service, because the best leader of American men, thoroughly understands the relation of discipline to both the faults and the merits of American democracy.

Discipline which has as its basis fear may often seem to go far and to control a splendid machine, but it will crumble in the last crisis. Discipline whose basis is leadership and the *intelligent* loyalty of the men in ranks will never crumble.

Secondly, to be in the United States Navy means to comprehend the American naval officer's conception of military character. One must be in the navy, I believe, to see precisely what this is. It includes, of course, many traits of character which belong to the successful man in business or the professions, and it should, therefore, include qualities too numerous and too obvious to mention. More especially, however, it must include, according to Admiral Sims, "the two wholly essential twin qualities of loyalty and initiative." Of loyalty nothing need be said here, but what is *initiative* in a military service of command and obedience? On the answer to that question may depend the issue of battles and campaigns. It is an exceedingly delicate question—this "Initiative of the Subordinate." It is that quality which must be used in the absence of a superior officer or in circumstances where the superior cannot guide. Yet this initiative should be in harmony with general principles approved by the superior and by the higher command—those general principles and directions which are known as the "Doctrine." One great task of superior officers, from the staff and the commander-in-chief down, is properly to "indoctrinate" junior officers. All officers are to be guided by this doctrine; for they are told as a rule *what to do,* but not, save in general, *how to do it.* Such was the system established in the British Navy by Nelson, and Lord Nelson is, perhaps, the greatest example of the naval leader who "indoctrinated" his officers. At the battle of the Nile, Nelson gave no orders of detail, but Captain Foley, who led the line of battle, did precisely what Nelson would have done, because he had been given a doctrine covering the situation which then confronted him. Indoctrination, there-

fore, is no new thing. Fortunately, however, the Initiative of the Subordinate is a system peculiarly adapted to the American temperament, or to what Matthew Arnold would call the American "genius." It is American "team-work" raised to the rank of a military science.

Now this team-work and initiative demands, all along the line, the proper conception of military character—a conception, that is, in harmony with the character and customs of the people whose navy is concerned. In the American application of the system, democracy is far from being a hindrance. On the contrary, it is essential. Disastrous effects would be caused by brutality or tyranny. And not only would tyranny be harmful, but, to quote Admiral Sims once more, "bad manners, lack of sympathy and tact, ignorance of, or disregard of, the elementary principles of governing men, and mistaken ideas of punishment," would have the effect of throwing a monkey-wrench into an intricate and smooth-running machine. Our vice admiral in British waters goes on to illustrate his conception of the initiative of the subordinate and of military character combined, by telling a story of Nelson. It seems that on one occasion Nelson came on deck and found the ship—a flagship, remember—"in irons." She was, in fact, making sternway. Instead of thundering abuse at the officer of the deck, who was profoundly humiliated, Nelson asked him what he thought he had better do. The officer said he did not know what to do, whereupon the admiral said, "Neither do I," and went quietly below.

In the third place, to be in the United States Navy means to absorb that navy's imperishable traditions. Traditions are what Sir Arthur Conan Doyle calls "the memory of a great age." You may remember this passage from Doyle: "Treasure it in your minds, and pass it on to your children, for the memory of a great age is the most precious treasure that a nation can possess. As the tree is nurtured by its own cast leaves, so it is these dead men and vanished days which may bring out another blossoming of heroes, of rulers, and of sages." Lieutenant Frost, of our navy, in applying these eloquent words, comments on them by saying: "We in the service must therefore bring back our great tradition; we must learn the exploits of our dead heroes, the principles upon which they fought, the spirit which actuated them, and

the ideals toward which they strove. We must 'here highly resolve that these dead shall not have died in vain.'"

What are the traditions of the United States Navy? You have but to stand, over there in the crypt of the chapel, beside the tomb of John Paul Jones, to feel those traditions, if indeed you do not *see* them, hovering over his remains like "a blue, lambent flame." Or look upon the great collection of trophy flags of the navy, yonder, in the auditorium. If ever tradition lived "in the flesh," it lives in those captured flags, in that old bunting, faded but still glorious.

These traditions, however, are not all of the dramatic kind. Gold lace there is, and cocked hats; Perry changing his flagship; Farragut lashed to the shrouds; many a thrilling stage-setting on many a deck; swords surrendered, only to be returned with some chivalrous word. But most of it, almost all of it, is a tradition of *hard work;* hard work that was probably unappreciated, unrewarded, unsung.

One of the navy's traditions is thorough and unremitting preparation for battle. This was the kind of preparation Oliver Hazard Perry made during the long and bitter days before the battle of Lake Erie, when he built ships from trees standing in the forest; the kind that Farragut made before he finally went into action at New Orleans and Mobile Bay; the preparation of Macdonough for the battle of Lake Champlain, when he built his flagship—laid the keel on March 2, and had her launched on April 11; when he made ready to wind his ships end for end during battle, to present by surprise fresh broadsides. This is characteristic of our long line of naval officers, and the tradition holds to-day. Our first flotilla of destroyers arrived in a British port. "When will you be ready for business?" was the query. "We are ready to begin at once; we attended to that on the way over."

Another tradition is adaptability—the readiness to adapt strategy and tactics to new and unexpected conditions. David Porter was confronted with the entirely new problem of conducting the *Essex* through a cruise thousands of miles from base or shipyard, cut off from supplies and from money to pay his crew. He adapted himself to new conditions, and kept the *Essex* in the South Pacific for two years, while he destroyed the commerce and the whaling industry of the enemy from Cape Horn to the Galapagos. Foote, salt-water sailor, must needs at short notice design and build gun-

boats for operations on the Mississippi, and carry out with them, when built, a campaign which proved that new conditions cannot daunt the American naval officer. Worden took command of the *Monitor,* an unheard-of, crazy vessel, the unseaworthy "cheese-box on a raft," and with this monstrosity arrived from New York at Hampton Roads in time to check the *Merrimac,* and prevent her from breaking the Union blockade. Cushing was not dismayed by that perilous device, the spar-torpedo, handled by lines from a picket-launch. Nor was he confused when his approach to the ram *Albemarle* one dark night was discovered, and in the flare of a beacon fire he saw the boom of logs which surrounded the Confederate vessel. At full speed he struck the logs, managed barely, but did manage, to slide over them, and with one shot destroyed the ram, and ended the war in North Carolina.

Similar to this adaptability is a tradition expressed in the old phrase "Yankee ingenuity." When Isaac Hull, in the *Constitution,* was being chased by a British squadron, he saw a squall coming up ahead. It looked dangerous. Just before the rain enveloped his ship, Hull suddenly took in almost all his canvas. The British, knowing his reputation as a brilliant and daring seaman, followed suit. The instant the *Constitution* was hidden by a squall, Hull set every thread of canvas that would hold, and escaped from his pursuers. *Old Ironsides,* herself, and her sister ships were the product of native ingenuity—product of the brain of Joshua Humphreys, Yankee shipbuilder; product of the brains of our naval officers who supervised and modified their construction. These frigates were the finest of their day, outclassing other men-of-war of the same type. To take another example of the tradition, Winslow, in command of the *Kearsarge,* when he fought and sank the famous commerce destroyer *Alabama,* protected the engines of his wooden ship by fastening over the side closely adjoining lengths of heavy chain anchor-cable.

Still another tradition, by no means dramatic, is summed up in the motto of the Naval Academy—*Ex Scientia Tridens*—Sea Power Is Based on Science. In the very dawn of our naval history John Jaul Jones, the "Father of the Navy," outlined with scientific precision the ideal of a naval officer's education and training, and fixed the relationship between the naval officer aboard ship and those under his command. In his classic letter to the Marine Committee, dated September 14, 1775, he formulated a doctrine

of studies which still constitutes the basis of an officer's schooling. It is well worth while to read that letter to-day; and it is to be hoped that you will take the pains to read it.[2] Matthew Fontaine Maury, American naval officer, created the modern science of charting ocean winds and currents, and in his own lifetime thus shortened the average long sailing voyage by 40 days. He predicted the location and directed the discovery of the Atlantic plateau, and in this and other ways scientific—partly through inspiring his assistant, Lieutenant Brook, to invent a deep-sea sounding apparatus—made possible the laying of the first Atlantic cable. He founded the great system of our national weather bureau. He was the pioneer in the development of mines; and foreign naval officers, to learn mine-laying, went to school to him. To take another example, Admiral Dahlgren, inspired by the crisis of the Civil War, invented the gun that was named for him. The "Dahlgren" gun was the most advanced type of smooth-bore ordnance of that time. Scientific in its special feature, the "curve of pressures," heavy at the breech and light at the muzzle, it attained a

[2] Extracts from a letter from John Paul Jones to the Marine Committee of Congress, September 14, 1775:

". . . . It is by no means enough that an officer of the navy should be a capable mariner. He must be that, of course, but also a great deal more. He should be as well a gentleman of liberal education, refined manners, punctilious courtesy, and the nicest sense of personal honor.

"He should not only be able to express himself clearly and with force in his own language both with tongue and pen, but he should also be versed in French and Spanish . . . .

"The naval officer should be familiar with the principles of international law, and the general practice of admiralty jurisprudence, because such knowledge may often, when cruising at a distance from home, be necessary to protect his flag from insult or his crew from imposition or injury in foreign ports.

"He should also be conversant with the usages of diplomacy and capable of maintaining, if called upon, a dignified and judicious diplomatic correspondence; because it often happens that sudden emergencies in foreign waters make him the diplomatic as well as military representative of his country, and in such cases he may have to act without opportunity of consulting his civic or ministerial superiors at home, and such action may easily involve the portentous issue of peace or war between great powers. These are general qualifications, and the nearer the officer approaches the full possession of them the more likely he will be to serve his country well and win fame and honors for himself.

"Coming now to view the naval officer aboard ship and in relation to those under his command, he should be the soul of tact, patience, justice,

minimum of weight with a decisive gain in power. Admiral Stephen B. Luce, by a lifetime of effort largely unappreciated, founded the modern school of naval organization and strategy conceived as a science. Known as a master seaman, who raised seamanship to the highest technique, Luce went far beyond that. He established and developed the "war game," for planning and conducting naval battles and campaigns both at a war college, in miniature, and with all the practical results possible in time of peace by maneuvers at sea. He selected Mahan as the first organizer of the Naval War College; and it was he who inspired Mahan to write *The Influence of Sea Power upon History*. "Our Naval War College is his monument."

To-day, if I am not mistaken, you will find that the devices which will meet and conquer the German submarine will be for the most part the devices or the inventions of American naval officers, and their tactics and strategy are looked upon as those of a new school of hopeful augury. To quote the English naval expert,

---

firmness and charity. No meritorious act of a subordinate should escape his attention or be left to pass without its reward, if even the reward be only one word of approval. Conversely, he should not be blind to a single fault in any subordinate though, at the same time, he should be quick and unfailing to distinguish error from malice, thoughtlessness from incompetency, and well-meant shortcoming from heedless or stupid blunder. As he should be universal and impartial in his rewards and approvals of merit, so should he be judicial and unbending in his punishment or reproof of misconduct.

"In his intercourse with subordinates he should ever maintain the attitude of the commander, but that need by no means prevent him from the amenities of cordiality or the cultivation of good cheer within proper limits. Every commanding officer should hold with his subordinates such relations as will make them constantly anxious to receive invitation to sit at his mess-table, and his bearing toward them should be such as to encourage them to express their opinions to him with freedom and to ask his views without reserve . . . .

"I trust that I have now made fairly clear to you the tremendous responsibilities that devolve upon the Honorable Committee of which you are a member. You are called upon to found a new navy; to lay the foundations of a new power afloat that must some time, in the course of human events, become formidable enough to dispute even with England the mastery of the ocean. Neither you nor I may live to see such growth. But we are here at the planting of the tree, and maybe some of us must, in the course of destiny, water its feeble and struggling roots with our blood. If so, let it be so! We cannot help it. We must do the best we can with what we have at hand!"

Arthur Pollen, "The hope of the world lies in the untired brains of the American Navy."

But these traditions just mentioned would be "as a sounding brass and a tinkling cymbal," "vanity of vanities," were it not for traditions more heroic—traditions of fighting, and of a fighting school of thought. These matters are, of course, most difficult to define. You can feel them better than you can express them, for they constitute not words, but action.

There are two main traditions of this kind, as I see them. One is the unusual combination in action of two traits—coolness combined with quickness. Need it be said that to be cool in action is one thing, and not a little thing; that to be quick is another thing, and a great thing, but not necessarily associated? Neither, of necessity, implies the other. Coolness is often found with slowness; quickness is not always guided by a "cold-blooded brain." But to have both—like the best type of the American naval officer—this is to maintain a tradition which will count heavily when the first salvos are fired on some stricken field of the sea, where the fate of nations may be decided.

The second of these traditions is the inbred doctrine, now become an instinct, which I shall call the instinct for taking the offensive. Does this seem obvious? If it does, it is only because it is long established as a characteristic fact. Is it commonplace to say that as a principle or policy "the defensive never accomplishes more than to postpone disaster"? Is the instinct for taking the offensive to be taken for granted? If so, then Blake, and Horatio, Lord Nelson, and David Glasgow Farragut were merely men who did the obvious thing, the thing to be taken for granted.

To be in the United States Navy means that you have the privilege and the duty of absorbing these high traditions. No officer, reserve or line, can know them too well. They must be taken to heart by all ranks. One of the greatest factors in the power of the British Navy is tradition. The tradition of the *Birkenhead* has been repeated in this war. Sir David Beatty, at Jutland, repeated the tradition of Nelson at St. Vincent. Recently, two British destroyers, pounced upon at night by six German destroyers, sank or routed them; one British destroyer ramming her nearest opponent, and a young midshipman, repelling boarders as of old, accounted for six Germans. A boy of 16, Cornwell, mortally wounded, and all others of his gun-crew slain, remained through

the battle of Jutland at his post of duty. Such are the "chips of the old block." You cannot become too directly the descendants in spirit of Jones and Truxtun, Hull and Decatur, their names "familiar in our mouths as household words," Bainbridge and Stewart, the Porters and the Perrys, Cushing, Farragut, Sampson and Dewey, "among the few, the immortal names that were not born to die." What a line is that to follow! And where can you become instilled with their spirit better than right here at the Naval Academy, in yonder flag-room, its walls veritably ablaze with the trophies of their prowess? Would you have a visible link with this long honor roll of the past? It is here, in the jack and pennant of the *Guerrière;* it is here in 42 naval ensigns captured from the victors of Trafalgar; in tricolors captured from France. And the memory is the more splendid because these foes of an elder day were met in actions of chivalry and honor which left no bitterness. Foe or friend at different times, they are now our brothers in arms. Turn, then, to the most eloquent flag in the collection, the battle flag of Oliver Hazard Perry—that flag on whose blue field, in white letters, are spelled out the dying words of Captain James Lawrence, commander of the ill-fated *Chesapeake.* Rudely fashioned by the hands of jack-tars, these letters said then, and they say now: *"Don't give up the ship!"* I think you will agree with me that we wouldn't give up that flag. And I feel safe in saying, also, that we should be glad to give up a number of the flags taken from England and from France if we could replace them by a few naval ensigns captured in battle from the Imperial German Navy.

So much for what it means to be in the United States Navy. What, then, does it mean to be an officer in this navy?

Does it not mean more than a difference from the enlisted man in training and in education? He can see, perhaps, not much more than his own gun, or turret, or his own ship. Whereas the officer must see his particular duty, not only as part of his ship, but as part of the fleet, part of the entire navy, of a campaign, of a war, whose causes and motives, whose international aspects and results, the officer must understand and visualize. It means that whereas the bluejacket *may* have the proper attitude toward our allies, the officer, through his knowledge of history, *must* have the proper attitude toward our allies.

To be an officer means constant striving to master the most complex and versatile, at least, of professions. You are beginning to find out, with a vengeance, I take it, something of this complexity and versatility of the naval profession. Frankly, I do not know just how difficult and varied it really is. But I do know that few people outside of the navy have a very clear conception of the problems a naval officer must meet.

Most of all, to be an officer means to know what are the true qualities of the naval hero. What are these qualities? They are seldom appreciated. Courage? To say this is commonplace. The naval officer discounts death in advance. Skill? That is what he is paid for; lacking it in reasonable degree, he had better resign. No. The real quality of the naval hero is the ability to conquer certain weaknesses of human nature. Under the spur of duty, he should rise above many things insidious and demoralizing.

He must have confidence in the patriotism of the American people, despite any evidences to the contrary noticeable from knaves or fools. He must believe in the value of democracy, despite the inherent weaknesses of democracy, which we are now doing so much to overcome, and which at their worst are better than the inherent vices of autocracy. For how else is he to fight that the world may "be made safe for democracy"? He must have confidence in the capacity of the government to conduct a great war, no matter how new or how gigantic the task. Mistakes of the past he must put out of his mind; it is for him to undo them, according to the old motto of the neglected navy: "Do always, without faltering, the best you can do under the circumstances." And the naval hero must have faith in the wisdom of the higher command, whether or not he is given the opportunity to increase its wisdom. It is not always easy to conquer the doubts and misgivings which naturally arise about these things in an imperfect world. But unless the officer gives them always the benefit of the doubt, unless he accepts the situation as he finds it, and is governed accordingly until such time as he can help to improve it, he will not attain to the reasonable human ideal of *morale*, and the ideal of loyalty. Let him remember that, like the President, he is a federal official, and that, like the President, he must have almost the patience of Nature itself.

Nor are these the only demoralizations to be conquered. There are more immediate ones for the naval officer. Heroism means rising above the feeling that he lacks the citizen's privilege of free speech and free criticism; that to exercise this privilege, even in a subordinate way, generally means punishment for insubordination; that such a situation is not always for the best interests of the service; that these are severe penalties for disciplinary efficiency. He must conquer also the more insidious feelings: that his duty is unimportant, and merely that of a cog in a machine; that, under a different commander, he could do better; that he is not appreciated by his superiors; that his death would be unnoticed. He must throttle the natural temptation to suppose that the mistakes he makes and the misfortunes he encounters are irrevocable. Above all, he should put out of his heart and mind the suspicion that he deserves a more important post of duty, and that the duty to which he believes he should be assigned is filled by the other man through "pull" or favoritism.

The naval hero must make sound decisions and make them quickly in the heat of battle, amid the roar and crash of weapons and projectiles whose power has never before been imagined. He must keep his head when everything seems to be going wrong—and when everything *is* going wrong. He must be another Nelson at Copenhagen; another John Paul Jones on another *Bonhomme Richard,* sinking and on fire. His answer to the imminence of defeat must be Jones's answer to the captain of the *Serapis:* "I have not yet begun to fight." When defeat seems inevitable; or when, as now, no completely effective means have been found to eliminate the all-decisive menace of the submarine, the naval officer falls back upon tradition. And lest he feel that tradition knew not the submarine, let him think of the retreat from the Marne, when the world awaited, breathless, the end of France, or, hoping against hope, wondered when would come the hour of her desperate stand. Let him think of that man on whose great head, set on whose broad shoulders, rested the fate of civilization for centuries—while for many days the armies of France accepted, under his guidance, the bitterness of retreat—and again, retreat. Think of the mind and the spirit that planned during those terrible days the alignments and the formations, the time-schedules, positions, and reinforcements, the mobilization, indeed, of the hopes of France and of the world—Marshal Joffre.

And now, you who have entered the navy to-day, what does it mean to be a part of it to-day, rather than yesterday and in the past? First, there are the advantages of recent development and achievement. We have the best torpedo in the world. The Bliss-Leavitt is the most accurate, and has, by a good margin, the longest range. We have, now, the best system of fire-control and of director-firing. There are other details. I wish I could mention them. They would warm your hearts. In short, we have a first line of capital ships, and certain other types, which, ship for ship, are unsurpassed. Among the enlisted personnels of the world's navies, our own has the highest average of intelligence. The training of our officers and their education is probably unequalled. The organization is better than ever before, and may soon be better still. Faults there are, but they are not the faults they were in the past, either in kind or in degree.

It has always been a privilege to be an American naval officer, but that privilege is especially high to-day. In this great war lies the greatest opportunity in our history to show the world the stuff of which our navy is made. We are even now approaching the time when the American Navy may be the deciding factor of the war, and hence of the history of democracy on this planet. Our task, as that of the British, has never been so formidable as it is to-day. Farragut, our greatest naval officer, and Nelson, "the embodiment of the sea power of Britain," did not have to face the submarine let loose as the outlaw of the sea, slayer of the helpless, beside which Attila, the "Scourge of God," seems humane.

To be in the navy to-day, fighting in this war against Prussianism, you need not give Decatur's pledge: "My country, may she be right; but, right or wrong, my country." For your duty can be based upon a clear conscience, knowing the justice of our cause. Even if we could forget all else, the Pan-German plot is a proved reality. It is not for nothing that the eagle of the Hohenzollerns is black.

To-day we are fighting in excellent company, as an ally of our chivalrous foe of the past, Great Britain, and of our old benefactor, France, the nation which enabled us to win our independence at Yorktown. We have many other allies, and nations armed with us in the common cause. I cannot serve the purpose I have in mind by considering them here, except to say

that some of us, through lack of information, perhaps, are apt to fall short a bit in appreciation of the immense difficulties and superhuman achievements of Italy. The most immediate duty of the American naval officer to-day, in maintaining the proper attitude of mind toward our allies, is to understand our true relations with Great Britain and France. The German propaganda, spreading its mental poison broadcast in the United States, finds itself powerless to stir up prejudice against France, and must therefore content itself with sinister stories that France has been "bled white." But it has had too much success in playing upon the obsolete antagonism toward Great Britain. To certain misguided or traitorous persons, nothing has happened in history since 1776 and 1812. The truth is that both Great Britain and the United States have changed to so large an extent that they are both new nations; both have followed paths which have taken them farther and farther away from old faults, and have brought them closer and closer together. Since the Reform Bill of 1832 England has almost outdone us in developing democracy. During the war with Spain she was our one staunch friend, and her strong arm was stretched out to secure for us fair play. Both nations, since 1848, have drawn farther and farther away from Germany in purpose and ideals. With the present war, the unconscious alliance of the past 15 years has been cemented. Confronted with German intrigue and German atrocities, Americans must be proud in a new sense to speak the English language, to inherit the English common law and jury system, and to enjoy liberty, freedom of speech, and self-government won no less by Englishmen than by our forefathers from a throne on which sat for a time kings of German blood. The wheel of history has now turned so far that even our traditional prejudices against the British, long kept alive by school histories, are going the way of the centuries-old enmity between England and France—buried in a new recognition of common aims and ideals. We are beginning to take some measure of satisfaction in remembering that George Washington was born and bred a British subject, and that one of Washington's contemporaries arose in the House of Commons and said of the American Revolution: "If I were an American, as I am an Englishman, I would never lay down my arms—never—never—never!" Those who cannot forget 1776 and 1812 should seek the spirit of the French officers who honored the British Army with

a review on the anniversary of the English victory at Agincourt, a ceremony of welcome on the very field where France met defeat at the hands of the most dreaded enemy in her history, Henry the Fifth. If we cannot forget the past, let us realize that the traitors to the United States and the friends of Germany are those most concerned to have us remember it.

We are now reminded that the American Navy was, in fact, originally modelled upon the British Navy, and that in fighting alongside the older service in the North Sea we are in one sense rendering an account for this inheritance, and thus upholding, as Sir David Beatty says to us, "The chivalry of the seas."

We are fighting in excellent company to-day as an ally of France, the old friend whose language gave us the very word "chivalry." If Americans have a British naval heritage to vindicate, they have a naval debt to pay to France. They can go into battle with the French, remembering not only Lafayette, but those days in 1781 when Admiral de Grasse of the French Navy held the control of the sea off the Virginia Capes, won against Hood and Graves the battle of Cape Henry, and made possible the siege of Cornwallis by an army in which the numbers were equally American and French—7000 under Washington, and 7000 under Rochambeau. Now, when France is stricken, the United States is glad to answer the call of an old memory.

Doubt not that to-day the spirit of yesterday still lives. Sir Francis Drake and John Paul Jones are sweeping the Channel again. Nelson and Farragut have put to sea once more.

It is not for us to determine, gentlemen, whether the German naval bases are impregnable, or whether the United States Navy will lead the way when the German high seas fleet is hunted out. It is said that Heligoland and the channels that lead to Wilhelmshaven are but "suicide" for an attacking fleet; that these are not the days when a Farragut could say "Damn the torpedoes! Go ahead, Captain Drayton. Four bells!" They told Farragut that Mobile was impregnable, with its forts and mines prepared for three years. Whether Heligoland shall be a second Mobile on a great scale is for admirals to decide. Weapons change; ways and means change. But one thing has long since been decided and has not changed, and that is this: It is in the blood of the United States Navy to take the offensive! It is in the spirit of the United States Navy, if the day comes, to go *through* and *past* that place, Heligoland, which is impregnable!

And the reserve officers, on that day, and on other days, will be "chips of the old block." They will fight with the unconquerable tenacity of the race of which they are the descendants—of a mighty line that did not begin with Drake, and did not end with Dewey.

In a newer and larger sense, the spirit of to-day not only equals the spirit of yesterday, but surpasses it. As civilization has progressed, old feuds between certain nations have been forgotten, since the outcome of these wars often determined great questions for the advancement of mankind. The French and the English, who fought at Crécy and Poitiers, who were still hereditary enemies at Waterloo, stood shoulder to shoulder at the Marne, and now constitute one great army. The British and the Americans who fought at Lexington and Bunker Hill have joined hands in France. Americans of the North and the South—Union blue and Confederate gray, now brothers in olive drab—are marching to the fields of Flanders. With these *ententes* and alliances, this Reconstruction Period and this Union, now international, there is an immense increase in the power of freedom and the efficiency of human rights.

Where once feudal levies raised battle-cries to St. George or St. Denis, where once were fought wars of dynastic ambition on both sides, the armies of self-governed peoples battle to-day for the freedom of Europe and the liberty of the world. On the same fields where men once fought for conquest, the United States now enters the lists for no conquest, but for ideals. We are bringing, with our allies, to all nations, our Declaration of Independence. We are now maintaining that not only our own government, but all governments "of the people, by the people, for the people, shall not perish from the earth." To the battle-song of our race, heard from the time of Magna Charta to the Gettysburg Address, we have added new words greater even than the Battle Hymn of the Republic: "The world must be made safe for democracy."

Dedicated to this proposition, dedicated to fight in the vanguard for the accomplishment of this world task, is the navy of the United States.

All of this, gentlemen, is what it means to be an officer in the United States Navy to-day.

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE LOSS OF THE BRITISH MOTOR VESSEL *SEBASTIAN*

By ENSIGN Z. W. WICKS, U. S. Navy

The following account, with comments derived from personal observation, is rendered in hopes that the points brought out might be found useful in the prevention of a similar loss, especially as every ship lost in this manner is a material aid to the German submarine campaign.

At 5.45 p. m., May 8, 1917, the British motor vessel *Sebastian,* about 24 hours out from New York and bound for Rouen and Havre, France, with a cargo of petrolite, sent out an S. O. S. call. It was answered by the Norwegian steamer *Christianafyord* and the U. S. S. *Sacramento.* The former stood by until the *Sebastian's* crew was taken aboard the latter and then resumed her course.

The *Sebastian* was burning fiercely aft, and nothing could be done that night to extinguish the fire. The crew was brought aboard the *Sacramento.* The following afternoon, the woodwork aft having been consumed, the fire abated sufficiently to allow fighting it with the modest means at hand. The work was started by a fire and rescue party from the *Sacramento,* which was relieved later in the afternoon by the ship's crew. The *Sebastian* was taken in tow at 4.30 p. m. By daylight the fire was under control. The engine-room had gradually filled with water, and at 6.30 the ship sank by the stern. The crew of 36 officers and men was taken off by boats from the *Sacramento,* with the loss of one man.

The *Sebastian* was a tank motor vessel owned by Lane and Macandrew of London. The vessel was heavily laden and her only reserve buoyancy was located in the forward trimming tanks and ship's hold, and in the engine-room and after trimming tank. In the large engine-room aft were located the propelling machinery (Diesel engine), auxiliaries and two boilers, one above the other, for auxiliary use. Coal bunkers containing 50 tons of coal were

located outboard of the boilers on both sides of the ship. Forward of the engine-room was the main fuel oil tank, about 10 feet long, which occupied the full cross-section of the ship. Between the fuel oil tank and the after cargo hold was interposed a 4-foot coffer-dam. There were located in the engine-room two ready fuel oil tanks, holding about 5 tons of oil, which were filled daily. The overflow of these tanks was on the engine-room floor plates, and no filling safety devices were installed. The engine-room watch consisted of two engineers and an oiler.

The ready fuel oil tanks were being filled in the first dog watch, and by some undetermined cause overflowed. The oil spread over the engine-room floor plates into the bilges and came in contact with the hot exhaust piping of the main engine. This ignited the oil, the flames spread rapidly and drove the watch out of the engine-room immediately. The fire spread into the ready fuel oil tanks and the coal bunkers, the doors of which were open. The engineers' living quarters, which were located alongside the engine-room hatch, were soon afire. The woodwork on the poop caught fire from there and the whole stern of the ship became very quickly a mass of flame. The intense heat of the burning oil and coal buckled the decks and sides of the ship and started the seams and rivets to such an extent as to allow water to pass into the engine-room. The forward bulkhead of the engine-room was affected in the same manner. As the fuel oil seeped through it caught fire, and the after side of the bulkhead became a sheet of flame, as was observed the following day when deciding upon the method to be used to fight the fire.

The oil in the main fuel oil tank became dangerously heated, and several spontaneous combustions of the gas at the top of the tank took place on the afternoon of the second day. The covers of the two large hatches in the top of the tank, on the after well deck, were removed and sea water was pumped in by means of a handy-billy brought over from the *Sacramento*. After the oil had been somewhat cooled in this manner, the suction of the handy-billy was placed in the tank and the mixture of oil and salt water pumped overboard. More water was pumped in from time to time in an attempt to save the forward bulkhead of the engine-room, which was becoming red hot. In this manner the fire was extinguished soon after daylight on the morning of the 10th. By the time the fire was put out, so that access could be had to the engine-room, the ship was settling by the stern and heavy seas were breaking

over the poop. The cargo was protected by the coffer-dam which was flooded by means of sea-valves soon after the fire started.

The sketch of the course of the fire and brief outline of the location of the compartments in the after part of the ship lead to proposed alterations in the design and equipment of the vessel which might prove of value in preventing a recurrence of such an accident on similar ships. The alterations are elementary and will require very little time or expense to make.

Undoubtedly the first and most important change must be made on the ready fuel oil tanks. A warning device to operate when the tank is 95 per cent full and an automatic closing valve to close immediately afterwards could be installed in a very short time. These devices are already in use on larger tanks. The overflow pipe should be fitted, in case the above devices fail to operate. However, it should discharge in some place in plain view of the engineer on watch, and where there would be no danger of the oil coming in contact with the hot piping.

The ship was not provided with any fire-fighting apparatus. It seems very pertinent that a vessel built to use heavy oil engines should be equipped with some form of a sand blast which could be operated from the upper gratings of the engine-room. An oxygen helmet for use by the man operating the sand blast would be very valuable and necessary.

The two boilers for auxiliary purposes were situated on platforms, one above the other, in the after end of the engine-room, as were the coal bunkers, so that all of the power on the ship was put out of commission by a fire in one compartment. The boilers should be placed in a compartment entirely separate from the engine-room. No hand pumps were carried on the ship. Handy-billys, as supplied to the naval service, are very serviceable. Inasmuch as the engine-room compartment was so large and formed practically all the reserve buoyancy aft, it would seem desirable to have a large power pump located in an accessible compartment, separate from the engine-room, and connected to the bilges of the latter.

In view of the construction of the ship and the location of the main fuel oil tank a coffer-dam, similar to the one between it and the after cargo hold, could easily be placed between the tank and the engine-room. Such a coffer-dam would have protected the main fuel oil tank, and the fire would have burned out in a few hours without the loss of the ship.

[COPYRIGHTED]

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

DESCRIPTION OF A BATTLE TRENCH PUMPING OUTFIT

By LIEUTENANT W. A. EDWARDS, U. S. Navy

Recently there was brought to my attention a photograph of a small, light-weight boiler which, I was informed, "was used to generate steam to operate the pulsometer pumps used to free battle trenches of water." This photograph led to a more thorough investigation on my part in the effort to secure more detailed information concerning the manner of construction and operation of this outfit, and the result proved so interesting as well as instructive that I venture to offer it for publication in the PROCEEDINGS in the belief that many others will find it equally interesting.

The complete steam trench-pumping outfit consists of three separate units—the tank unit, the boiler unit and the pulsometer pump unit.

Fig. 1 represents the tank unit on the left-hand side and the boiler unit on the right-hand side of the photograph. The tank unit consists of a stand containing one five-gallon water tank and one three-gallon fuel tank. In addition, the tank stand contains the pressure tanks into which the fuel is pumped by means of a hand pump from the main fuel supply tank and from which it is sent to the burner under a pressure of 60 pounds per square inch. This tank unit is also supplied with a hand fuel pump as well as a hand water pump which are actuated by a removal lever not shown in the photograph. In addition to the hand water pump, a Marsh steam pump is supplied with the boiler unit. The tank unit, when filled, weighs something less than 100 pounds.

The boiler unit consists of a small, light-weight, fire-tube, water-level boiler equipped with safety and blow-off valves, pressure and water gages and an automatic fire regulating valve. This boiler unit, when filled, weighs about 200 pounds.

A flexible steam pipe conducts the steam generated from the throttle valve shown on the upper left-hand part of the boiler to the pump.

The pump unit used in this steam trench-pumping outfit is a No. 2 pulsometer pump. With reference to Figs. 2 and 3 the operation of this pump is as follows:

It will be seen that the pulsometer consists of a hollow one-piece casting having two bottle-shaped chambers (*AA*) with their necks communicating at the top and each opening into the outer chamber

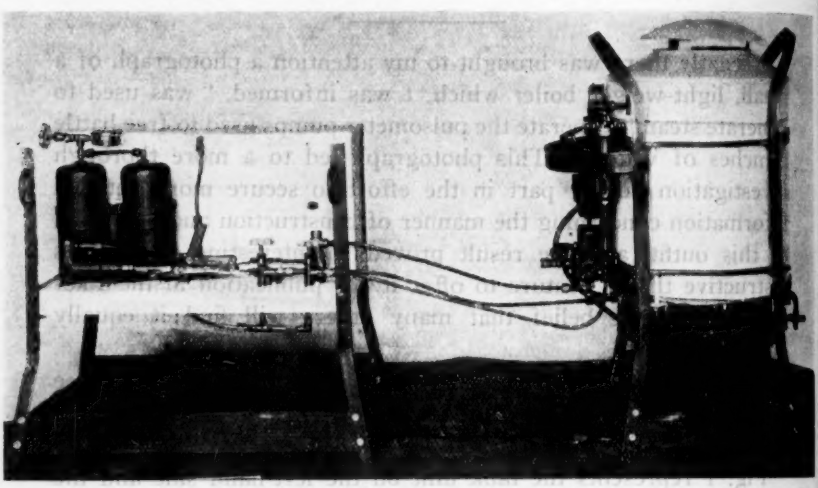


FIG. 1.—Steam Trench Pump Outfit. Manufactured by Stanley Motor Carriage Co. Newton, Mass. 14-in. Stanley boiler and burner. To be used in conjunction with No. 2 pulsometer steam pump. Capacity about 2000 gallons per hour at 60 feet lifts.

O through a check valve. An air chamber *J* connects with the suction inlet and serves to cushion the incoming pulsation.

Near the top of each pumping chamber is an inwardly opening air-check valve. These air valves automatically admit a small quantity of air at each pulsation at the moment the vacuum is formed. This layer of air serves two purposes: First, it cushions the inrushing water; and, secondly, it forms what may be termed an air piston separating the steam and the water and preventing the steam from being condensed at the beginning of the stroke. Air, being lighter than water and heavier than steam, admirably performs its function as a separating medium.

From the cross-sectional view it will be noted that the pump does not contain pistons, rods, slide valves or packing glands; in

fact, nothing but several self-acting check valves and a self-acting steam valve *C*.

The operation of the pump is as follows: Steam from the boiler is admitted to the pump at the top and enters either the right-hand or the left-hand chamber *A* depending upon the position of the steam valve *C*. This steam valve is a ball which is free to roll either to the right or to the left and forms a steam-tight joint with whichever seat it rests upon.

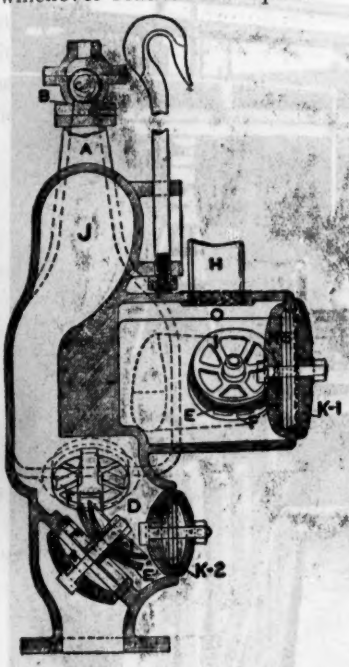


FIG. 2

FIG. 3

As shown in the sectional view, the steam would pass to the left-hand chamber *A*, which, we assume, is full of water. The pressure of the steam depresses the surface of the water without agitation, due to the air cushion mentioned above, forcing the water out of chamber *A* through a passage (not seen) and a check valve *F* (dotted) into the discharge chamber *O* and thence to the discharge pipe *H*. The moment the water falls to the level of the opening leading to the discharge chamber the even surface of the water is broken up, and, owing to the peculiar form of the pump chambers, the water and steam are thoroughly churned up and

brought into intimate contact thereby causing instant condensation of the latter. This forms a vacuum in the left-hand chamber, which, assisted by a slight upward pressure in the right-hand chamber, immediately pulls the ball valve *C* over to the left-hand seat shutting off the steam supply. The vacuum in the left-hand chamber now draws up a new charge of water through the suction pipe. While the left-hand chamber is filling the right-hand one is emptying. This completes one cycle.

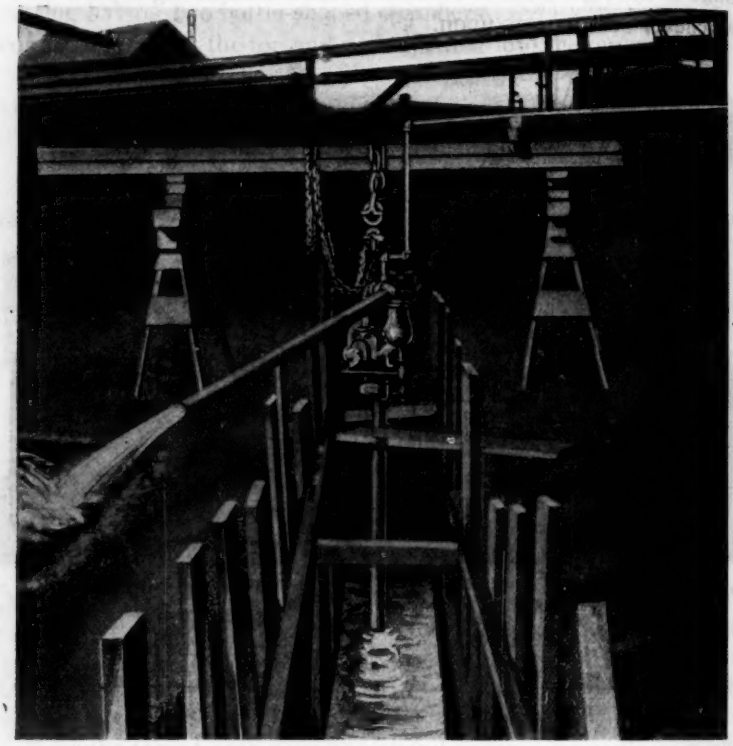


FIG. 4

It is thus seen that the action of the pulsometer consists in alternately emptying and filling the two pumping chambers. These operations continue so long as the pump is supplied with steam and water. The alternations follow so rapidly and with such regularity that the stream of water leaving the discharge pipe is practically continuous. The steam-valve ball oscillates from its seat

in the entrance to one chamber to its seat in the entrance to the other chamber serving the purpose of steam distribution with an exactitude not obtainable by hand nor possible by mechanical methods.

Fig. 4 shows a pulsometer in actual operation unwatering a trench. The pump, as is seen, is operating in a suspended position without foundation. Handles on the sides of the casting provide a convenient means of transportation from place to place. The pump is always ready for service the moment steam is turned on due to the foot valve retaining a constant prime of water. I have been informed that this type of pump never requires any lubrication and that it will pump anything that will flow.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

The Institute

There seems to have been some misunderstanding as to the right of temporary, reserve and other officers to become regular members of the Institute. A careful reading of the Constitution and of the paragraphs which follow will remove this misunderstanding. The eligibility of *all officers* of the navy to become *regular members* is unqualified.

Hand in hand with the teaching of the technique of the naval profession should go instruction in service ways of thinking, service habits, general naval developments, the progress and lessons of naval warfare, and the diplomatic relations which affect or are affected by the war. Officers responsible for this development and training will find that the stimulation of interest and enthusiasm will be greatly helped by membership in the Naval Institute or by subscription to the PROCEEDINGS.

The Institute presents material which is of general and educational interest to every one in the Naval Service and for that reason alone claims the active support of every officer in the service.

When it is recalled that the net proceeds of the Institute's Book Publication Department are devoted entirely to the maintenance of the quality of the PROCEEDINGS or returned to the entire service in the reduction of prices of books and manuals, it will be understood that "the advancement of professional and scientific knowledge in the Navy" still continues as the primary object of the U. S. Naval Institute. The Institute is a mutual company in which the profits are divided not only among its 3500 members and subscribers but also among the entire personnel of the Naval Service.

The PROCEEDINGS are published at a loss of over $5000 per year and with the low membership dues it is not expected that the PROCEEDINGS can ever become entirely self-supporting. A great increase of membership can, however, bring the receipts for the PROCEEDINGS to such a point that the expenses will be almost balanced, enabling still greater reductions in the selling prices of the Institute's Publications. An increase of membership means also an improvement in the quality of the PROCEEDINGS because of the wider literary field and greater quantity of material which will be placed at the disposal of the Board of Control.

The Institute claims for its own:

All officers of the Navy and Marine Corps, including those of the Coast Guard, Naval Militia, and Naval Reserve on active duty, as regular members.

All officers of other arms and branches of the U. S. Service and civilians interested in the naval service as associate members.

All enlisted men of the regular service as subscribers, the subscription being the same as dues for members.

Members are earnestly urged to lend an active hand in the expansion of the Institute by doing missionary work among the officers of vessels and stations who are not members and among the enlisted men who, though interested in the work of the Institute, are not subscribers.

Personal responses by officers interested in this matter will be greatly appreciated by the Secretary as it is practically impossible to keep in touch with individual members now that the publication of the monthly Register has been discontinued.

Amendments to the Constitution

Ballots received to date on the Amendments to the Constitution ordered submitted to the membership by the Annual Meeting, October, 1917, indicate that they will be almost unanimously adopted by the membership voting.

Members should therefore be prepared for the new scale of Membership dues and for changes in the Rules of the Prize Essay contest, to become effective, January 1, 1918.

It should be borne in mind, however, that the rules for the Prize Essay contest, 1918, will not be changed. Essays in competition for the 1918 prize should be submitted before January 1, 1918.

The new Rules for the Prize Essay contest, 1919, will be published in the PROCEEDINGS of January, 1918. In the January number will also be published the complete amended Constitution of the U. S. Naval Institute. It is also hoped that a complete membership list of the Institute can also be published in January.

Book Announcements

Attention is invited to the list of Publications for a complete list of books revised and republished within the present calendar year.

It is announced that the edition of The Landing Force and Small-Arm Instructions, having become ex-

hausted, a new edition will not be published, as The Landing Force Manual, U. S. Navy, 1917, is being compiled by a board of officers. The complete Landing Force Manual will be published in December, and will be ready for distribution in January, 1918.

Navigation and Compass Deviations, Muir, has been revised and all problems and solutions brought to accord with the new form of the Nautical Almanac. This revision has been completed by Mr. G. W. Littlehales and will be ready for distribution about January 1, 1918.

Suggestions Invited

Comment and suggestions relative to the make-up of the PROCEEDINGS are invited from all members interested in the welfare of the Institute. It is believed that the scope of usefulness of the PROCEEDINGS to members can be increased and all members are invited to assist in this work. Should any topic, on which you think an article could well be written, occur to you, send it to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood. The Institute is desirous of obtaining good "sea yarns" for publication. It is hoped that any one who can spin such a yarn will submit it.

Membership

Since October 18, 1917, 293 regular and 6 associate members have joined the Institute; about 250 of the new members came from the Second Reserve Officers' Class now assembled at the Naval Academy.

Deaths:

Captain A. C. Engard, U. S. Navy.
Lieutenant H. J. Lund, U. S. Naval Militia.
Captain Emil Theiss, U. S. Navy.
Mr. E. W. C. Humphrey.

Resignations: Two.

Book Department

The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers. Bills will be rendered upon delivery of books.

Illustrations Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Annual Dues The annual dues for 1917 became payable on January 1, 1917. It is suggested that dues be paid in lump sums covering a period of two to five years; this method of payment has advantages for members as well as for the Institute and is practiced by a number of members, both regular and associate. Response to this notice will save the Institute a considerable sum in stationery and postage.

In case of death or resignation, dues paid in advance, except for current year, will be returned to estate or individual.

Notice Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

Address of Members *All members are urged to keep the Secretary and Treasurer informed of the address to which* PROCEEDINGS *are to be sent, and thus insure their receipt.*

This precaution is now of particular importance as notices of changes of station are not now available for the use of the Institute's staff.

Non-receipt of Proceedings Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

Reprints of Articles

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

ANNAPOLIS, MD., November 17, 1917.

INFORMATION INDEX

	PAGE
ADVERTISEMENTS, INDEX TO	I
PUBLICATIONS, U. S. NAVAL INSTITUTE	(2)
SPECIAL NOTICE	3090
PRIZE ESSAY TOPICS	3091
LIST OF PRIZE ESSAYS	3092
COMPLETE TABLE OF NAVAL LOSSES	No. 173, p. 1633

British Official Photograph

Copyright Underwood & Underwood, N. Y.

BEATING OFF GERMAN AIR RAIDERS FROM ENGLISH COAST

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER I. C. KIDD, U. S. Navy

GENERAL ARRANGEMENT

		PAGE
VESSELS BUILDING. CHARACTERISTICS OF NAVAL VESSELS AND AIRCRAFT. NAVAL POLICY. MATERIEL. PERSONNEL. OPERATIONS.	Austria	2933
	Brazil	2934
	France	2935
	Germany	2936
	Great Britain	2946
	Italy	2961
	Japan	2963
	The Netherlands	2963
	Nicaragua	2963
	Russia	2963
	Spain	2964
	Sweden	2964
	United States	2964
ORDNANCE AND GUNNERY		2969
NAVIGATION AND RADIO		2971
ENGINEERING		2974
MERCHANT MARINE		2978
AERONAUTICS		2993
PERSONNEL		3002
SUBMARINES		3006
LESSONS OF THE WAR		3011
MISCELLANEOUS NOTES		3013
CURRENT NAVAL AND PROFESSIONAL PAPERS		3024

NOTE.—Ship construction in the nations at war is held confidential and no reliable information is available.

AUSTRIA

MUTINY.—There is reason to believe that the revolutionary movement in the German Navy had its counterpart in the Austrian fleet, for the Italians have recently come into possession of an Austrian torpedo-boat, No. 11, which was voluntarily surrendered to them by the crew, who had mutinied. This boat is one of a class of 12, launched in 1909-10. The displacement is 110 tons, the engines develop 2600 horsepower, and a trial speed of 28.8 knots was attained. The boilers are oil-fired. The armament is two 3-pounder guns and two 18-inch deck torpedo tubes. The complement numbers 21.—*The Engineer*, 26/10.

Official diplomatic dispatches received in Washington, October 18, report mutinies in the Austrian Navy and clashes between Austrian sailors and crews of the German submarine fleet based at Pola in which officers on

both sides have been killed, and which resulted in a decision to change the base of the German flotilla.

Despite the attempts of the Austrian Admiralty to suppress the news, it reached Washington, coming by way of Berne. The Austrian crews are said to have revolted under ill treatment of officers and bad food, while the clash with the German submarine crews was caused by the overbearing conduct of the latter.

The dispatches say that the tension between the Austrian and German crews became so alarming that extraordinary measures were taken to prevent a recurrence of the fighting between them, which included the decision to move the German submarine flotilla from the Austrian base at Pola to another point farther south on the Adriatic. The fighting between the two sets of crews is described as having been sanguinary.

This news of mutiny in the Austrian Navy, received in Washington almost at the same time as the Amsterdam dispatches reporting further mutinies in the German Navy—this time among submarine crews—created a profound impression among American naval officers and among other officials who have been watching the situation with expectation since the first mutinies in the German fleet were reported.

The first signs of mutiny in the German fleet were regarded as most significant, since, unlike the army, it has endured little of the hardship of campaigning. Dispatches from abroad, however, confirm the opinion of American naval officers that it probably was due in part at least to the drafting of seamen for submarine crews, a service which has come to hold terrors for the German seamen because of the inflexible British policy of never making any announcement whatever of the fate of captured or lost crews of the German submersibles. This suspense as to the fate of comrades who go out never to be heard of again was expected to undermine the morale of the navy.

Clashes between German and Austrian crews are regarded in naval circles as adding much significance to the situation, particularly when considered in the light of the extreme situation of Austria, whose fighting forces are at the point of exhaustion.—*Washington Post*, 19/10.

BRAZIL

COMMANDEERED SHIPS RE-NAMED.—Below are given the new names of the German vessels which have been taken over by the Brazilian Government. The *Belmonte* and *Parnahyba* have been incorporated into the Brazilian Navy, to be used as armed cruisers. The *Mearim*, ex-*Henriette*, is a sailing vessel. All the rest are steamers. The changes are: *Posen* to *Belmonte; Alrich* to *Parnahyba; Cap Roca* to *Itu; Roland* to *Ayurucca; Gertrud Woermann* to *Curvello; Arnold Amsinck* to *Jaboatao; Sierra Salvada* to *Avare; Etruria* to *Inga; Carl Woermann* to *Atlanta; Ebernburg* to *Acary; Hohenstaufen* to *Cuyaba; Franken* to *Taubate; Coburg* to *Pocone; Henriette* to *Mearim; Cap Vilano* to *Sobral; San Nicolas* to *Alfenas; Bahia Laura* to *Caxias; Sierra Nevada* to *Bage; Blucher* to *Leopoldina; Tijuca* to *Baspendy; Santos* to *Santos; Henry Woermann* to *Uberaba; Eisenach* to *Santarem; Gundrun* to *Barbacena; Correntes* to *Guaratuba; Walburg* to *Curityba; Salamanca* to *Alegrete; Persia* to *Aracaju; Minneburg* to *Caxambu; Steiermark* to *Camanu; Santa Lucia* to *Joazeiro; Rauenfels* to *Lages; Frieda Woermann* to *Macapa; Prussia* to *Cabadello; Valesia* to *Palmares; Gunther* to *Maranguape; Siegmund* to *Therezina; Palatia* to *Macao; Rio Grande* to *Benevente; Asuncion* to *Campos; Santa Rosa* to *Iguassi; Monte Penedo* to *Sabara; Santa Anna* to *Maceio; Pontos* to *Pelotas; Stadt Schleswig* to *Tabatinga.—Shipping*, 20/10.

GERMAN SHIPS TO BE RETAINED.—A special parliamentary committee in its report has approved the decision of the government not to dispose of the German vessels recently seized by Brazil. These will be put into service between Brazilian ports.

The committee also decided to recommend the suppression of the legislative provision which assured indemnity after the war to the owners or charterers of former German vessels.

The Brazilian Government, according to a recent dispatch, had under consideration the utilization of the seized German steamships for the organization of international steamship lines. It was said that the realization of this project depended solely on an understanding between Brazil and the Allies.—*N. Y. Herald*, 22/10.

FRANCE

TWENTY SHIPS ALLOTTED TO FRANCE.—The Shipping Board authorizes the following:

The Shipping Board has decided that from the ships completed or about to be completed in American yards that have been commandeered by the government 10 will be turned over to the French Government for the transportation of supplies to France and that 10 additional ships outside of those under construction in American yards will also be allotted to France for the same purpose. In selecting all 20 preference will be given to ships originally contracted for on the Great Lakes by French interests and by the Cunard Company.

The Shipping Board has instructed its director of operations to take charge on its behalf of all ships building for foreign account in American yards which were subject to the commandeering order of the Fleet Corporation of August 3, 1917 (except those heretofore ordered surrendered to their owners), as fast as the same are completed, and proceed to operate them on behalf of the Shipping Board, and that the same instructions be given as to all ships building for American owners who decline to accept their ships on the terms offered by the Fleet Corporation and the Board.—*Official Bulletin*, 23/10.

GOVERNMENT CONTROL OF SHIPPING.—The purchase abroad and transportation of about 122,000,000 bushels of wheat and other cereals is one of the problems of France for the campaign of 1918. Four hundred thousand tons of shipping a month will be required for the importation of supplies the country must get on the outside.

Henceforth all tonnage under the French flag will be systematically divided between the different categories of indispensable products. Voyages which were of no great utility to France have been stopped and the transportation of coffee and other products has been suspended. Orders have been given that cotton and tobacco must be brought from the nearest market.

Navigation between France and the colony of Madagascar will be greatly reduced, and the French lines to Cuba, Argentina, Brazil and New Orleans will be reduced as regards the number of ships, or sailings suspended altogether.

As a result of these measures, 180,000 tons of additional shipping have been placed at the disposition of the provisioning department.—*Washington Post*, 24/10.

COAL OUTPUT INCREASED.—According to official statistics the output of coal in France during the first half of this year has been 13,105,019 metric tons, as against 10,626,544 tons last year. The monthly output will probably soon reach 2,500,000 tons, which will make this year's output rise to about 28,000,000 tons, as against about 20,000,000 tons last year. About 40 per cent of the total output has been produced in the Pas-de-Calais.—*Shipping*, 20/10.

GERMANY

ANOTHER MUTINY.—Three officers and a number of sailors of the German Navy were killed in "another" mutiny at Kiel early in September, according to a dispatch from Amsterdam to the *Daily Express*, which claims to have authentic details. The outbreak occurred aboard the battleships *Kronprinz* and *Schleswig-Holstein* and started when the men revolted against being drafted into the submarine service.

The sailors on the *Kronprinz* threw Admiral Schmidt overboard and stabbed and threw overboard Lieutenant Raul, the admiral's aid, and another officer. A battle on the ship's deck between the officers and sailors followed. Three officers and a number of sailors were killed. Similar scenes occurred on the *Schleswig-Holstein*.

Admiral Schmidt was rescued, but it was necessary for him to leave Kiel. All the surviving mutineers were arrested.—*Washington Post*, 3/11.

German Version.—The Kiel *Neueste Nachrichten* reports that through the explosion of a torpedo in the submarine yards at Kiel, a submarine vessel was badly damaged and 10 persons were killed or wounded.

The newspaper says that "all other reports are without foundation," referring presumably to rumors of extensive mutinies in which various ships are said to have been damaged.

The battleship *Kronprinz* displaces 25,293 tons and was built in 1915. Her complement is 1150 men. The *Schleswig-Holstein* was completed in 1906 and displaces 13,000 tons. She carries 729 men.—*Washington Post*, 3/11.

INSIDE HISTORY OF AUGUST MUTINY.—The International News Bureau, Inc., has copyrighted the following article by Second Lieutenant Rudolph Glatfelder, of the German Navy:

"German blood has been shed in the cause of revolution. Other nations can no longer accuse us of not having such courage as is necessary for the making of rebellion. I am relating only one of the early incidents of the general discontent in the ranks of our navy. Before this account is printed other grave events may take place.

"Yes, no less than 12,000 sailors and marines were involved in this uprising. I am making this statement from personal knowledge. This refers to the last days of July and early days of August—the final suppression having been concluded on the 6th or 7th day of August, of which I have learned since leaving Wilhelmshaven. Beyond these dates other tragedies may have been enacted; our rulers may not have kept their agreements with the sailors and marines. It is to be expected. If they found that it was to their advantage to set aside their agreement they would do so without one moment's hesitation."

After a detailed account of revolutionary propaganda in the navy organized by the Central Terrorist Committee, which sent trusted agents to the great naval base at Wilhelmshaven, Lieutenant Glatfelder, who was in the thick of it, gives the following account of the mutiny there and its suppression:

"Very early in the day of July 30 about 8000 sailors and marines were called to the parade grounds, which is on the north of the naval barracks and on the south of the naval arsenal. To the east of the naval parade grounds is the rail track connecting the fitting-out harbor, with the forts defending the Jade Coast in the northeast. After the early parade and regular drill the sailors and marines were ordered into a semicircle. One of our comrades, who was a laborer in the parade grounds, hastily came to me with a message that the sailors and marines had just been 'formed' and were about to listen to a government propaganda.

"The government is now engaged in sending political orators to both the army and the navy, telling them why the Fatherland should continue fighting for a peace dictated by Germany.

"I hurried to the parade grounds. The government orator was wearing a brilliant naval uniform. He was one of the discarded 'graybeards' of the navy. I had never seen him before and was about to ask his name from one of the naval officers near me when the speaker ended his oration with a call for cheers for 'our beloved Kaiser and Fatherland.' The silence that greeted the admiral's call for cheers was not only embarrassing, it was uncanny. Other naval officers who surrounded the orator-admiral showed their anger. One of these jumped on the improvised platform and shaking his fist in anger shouted words which I could not hear, as the whole body of sailors and soldiers greeted his first few remarks with such spontaneous laughter that one would think they had trained and drilled to laugh together.

"Just then I noticed that the harbor commandant was standing very near me. I glanced at him several times, and from his attitude and facial expressions I judged that he was not in sympathy with the government propagandists, and soon was convinced that he was not a party to the scheme. I heard him shout to one of the officers near him, 'They should take them away before there is bloodshed!'

"The sailors and marines were ordered to form and march back to their barracks, which is in the south of the parade grounds. On their march back the eastern flank of the line had to pass by the platform on which the government's admiral-orator and his party were still standing.

"As the sailors and marines passed the indignant government orators watched them with disdain. I was told afterward that as the sailors and marines passed by the old admiral made insulting remarks, but the men did not answer these. But toward the end of the line one of the younger marines returned the old admiral's insulting remark with a sarcastic smile. Upon this one of the officers on the platform jumped from his stand and struck the offending marine on the face with his gloved fist. Although I did not hear the words that led to this incident I saw that the man was hit and I saw blood run from the face of the marine.

Then ensued a horrible scene that I will never forget. It was gruesome. It was not a battle, neither was it a riot. It was like 8000 hungry and angry lions let loose at their cruel keepers. The sailors and marines who until a few minutes ago had been listening to the patriotic orations and then to the cutting insults of the government orators had suddenly turned wild beasts. I heard groans and I heard shouts such as I have never heard before. Like hungry beasts struggling at a piece of meat thrown at them the men were practically fighting each other in their attempt to get at the handful of officers from whom the life had already departed. Never have I imagined such human beastliness. They were practically tearing at the lifeless bodies of some 50 or so men.

"This only lasted half an hour. The rioters, a big portion of them, proceeded towards the naval home, which was being utilized as one of the administration buildings. This is about half a mile west of the center of the parade grounds. Another group of perhaps 2000 marines and sailors headed towards the Zeppelin sheds. This group, on reaching the Zeppelin sheds, separated into two parts, and while one portion attacked the sheds and set fire to the hangars, which contained four Zeppelins, the other portion headed towards the observatory on the north of the naval arsenal. On the naval observatory there were two powerful wireless stations. I heard afterwards that the infuriated marines and sailors put one of the wireless stations out of use and damaged the other one slightly.

"Meanwhile the main body of the rioters had returned to the barracks, and after having destroyed everything in sight, aimlessly proceeded to the parade grounds. On learning that the two forts on the western side of the railroad had opened fire into the rebel ranks of the group that had set fire to the Zeppelin sheds, they destroyed the railroad junction that connects the warehouse in the extreme east and south, and the dockyards and the building harbor in the west. After thus cutting the communica-

tion between the forts and the warehouses and the arsenals along the railroads, they proceeded in smart battle formation toward the two arsenal forts. These forts lie in two groups in a northwest and southeast incline. The rioters then charged up the flank of the southern fort and had nearly succeeded in reaching it, when the third line land coastal forts opened their fire on the attackers.

"By this time I had taken a position at an upper window of the Catcholic Church, which is situated in the southwestern corner of the parade grounds. The attackers suddenly turned from the arsenal fort and attacked the third line land forts. They had succeeded in getting between the first and second fort from the south, when the second line land batteries, which lie across the path of the third line forts, opened fire. Then as if by magic the northern arsenal battery suddenly opened a terrific and indiscriminate fire on all the forts, excepting the southern third line land forts. For nearly half an hour the forts bombarded each other. And, although the rebel fort in the arsenal was engaged against 11 forts of all lines, they were getting the best of the battle.

"Because the rebel fort was firing its guns at the direction of the sea, for which purpose they were built, while the loyal forts were at a serious disadvantage by having to fire towards the land side, and therefore could not bring into action their larger caliber guns. On observing that the northern arsenal fort had declared for them, the rebels withdrew from between the first and second chains of the southern forts, and were taking cover behind the railroad embankments and preparing for further developments when the warehouses facing the fitting-out harbor caught fire. Then it was within a few minutes of noonday. Meanwhile desperate calls for reinforcements had already been sent out by the commandant.

"The Jade Sea was echoing and re-echoing with the thunder of guns. I heard a terrific gunfire from the north and from batteries across the Jade Bay. I judged at once, and afterwards my judgment was verified, that the authorities had ordered the firing of all the heavy and light naval and land guns to stifle the thunder of the guns that were actually firing at each other. Of course, this was done to convey the idea to the people near Wilhelmshaven that a serious army and navy target practice was going on. At any rate, two days later the authorities publicly announced that at a gun practice in competition between the army and the navy, the naval gunners had scored.

"Meanwhile the fire that had started at the warehouses facing the fitting-out harbor had consumed the eastern portion of the naval barracks. But at about 2 o'clock in the afternoon the fire was under control.

"At about 2.30 the forts ceased firing, I think because the aggressive rebel fort had run out of ammunition. Until 3 o'clock in the afternoon a solemn silence reigned. Although the rebels had fought well, the time had come for a leader. Although about 5000 of them had already fitted out the railroad embankment in the south as a defensive line, the remaining 7000 of them were scattered, doing damage to the harbor buildings, which, although a serious loss to the government, was of no advantage to the rebels. Just at this time I decided to leave my place of observation and try to organize the men who were scattered around the Zeppelin and observation grounds. As I left the churchyard I heard a terrific explosion; then a second one followed, which shook the ground with such force that it threw me off my feet. Three more distinct explosions followed, each as forceful as the first. These came from the direction of the imperial dockyards, on the western side of which are the dock slips. Afterwards I learned that four large warships had been blown up in the building harbor, but as I did not remain at Wilhelmshaven much longer after the suppression of the naval riot I was unable to learn the names of the ships. But since I have inquired and one of our naval comrades told me that the ships that were blown up were four uncompleted warships whose identity even very few naval officers seem to know.

"As I proceeded towards the observatory grounds I met large groups of invalid soldiers from the naval hospital marching pathetically towards the different groups of the rebels. From their shouts and encouraging remarks I knew that they were in perfect sympathy with them. But the pity of it all was that the rebels themselves had no pre-arranged plan. They were simply angry, desperate, and in their mad anger did not consider the consequence. In short, they were drunk with fury at their oppressive rulers. My purpose was to induce the scattered groups to join the 5000 rebels, who had taken cover behind the railroad embankments, and then to march to the third entrance harbor and try to reach their ships, as I knew that once they were on board their ships many of their officers would join them and the land batteries would be at their mercy. I also knew that time was precious, as sooner or later regiments of loyal troops would be brought to Wilhelmshaven and the rebellious sailors and marines would be surrounded both from land and sea.

"I was running towards the observation grounds when I saw a group of naval officers coming from the direction of the old naval home, also running in the same direction. As I did not know these officers, on seeing them I slowed up and hesitated. One of them coming toward me with a drawn revolver in his hand demanded if I was with the rebels or not. I gave him the word and we all reached the men. An old officer put himself in charge and ordered the rebel crew to their ships. The sailors and the marines instinctively obeyed and followed the command of the unknown officer, and within an hour the entire mutinous crew were on their march to different harbor entrances. As we crossed the fresh battlefield I realized that the rebel casualties were pretty heavy.

"The crew who belonged to the ships in the fitting-out harbor succeeded in reaching their ships, which numbered nearly 25. But when others approached the third entrance a terrific machine-gun fire suddenly opened upon them. Notwithstanding the rebels charged and succeeded in capturing a number of the machine guns. Another portion succeeded in setting fire to the easternmost warehouses. Meanwhile the crew who had reached their ships must have been having a difficult time in getting on board, as we again heard explosions and gunfire. About 7 o'clock in the evening the portion under my command had taken charge of the first bridge and was about to cross the entrance when I received word that all was lost. Loyal troops had already reached the grounds and large numbers were being landed on all sides. We still made desperate attempts to reach the ships, but very few of the men had hopes of being able to board them even if they did reach them. From the machine-gun sounds I heard from the direction of the second entrance I knew that all the ships must have by this time been manned by loyal soldiers who would not permit the mutinous crew to get on board. The men began to wake up to the seriousness of the coming danger. Group after group stole away and gradually I had only 800 or so rebels left with me. Even these began to get cool.

"It was about 9 o'clock when the fire fighters reached the burning warehouses. We were at this time on a narrow strip of land between the water and where the fire was raging. I hastily consulted with the men, and it was at once decided that all was lost, and that unless we all fought the fire, along with the fire fighters, we would all be consumed in another hour or so. After advising the men to do their best in assuming an innocent attitude, I urged them to return to their barracks at night—most of which had by that time burned—I walked towards the second bridge. I heard shouts from the further eastern side and knew that soldiers were landing. I shouted, and the answer came sharply. I shouted back my rank and position at the harbor, and, on approaching, I was met by two young military officers, who eagerly inquired if the situation was very grave. They seemed to be unwilling to have to fire upon their naval comrades and were glad to learn from me that the worst was over. I told the officers that seeing that the fire had got out of control, I had come to the grounds with a group of

patients that were light cases, but on reaching the place we had found the regular fire fighters on the ground. I had hardly finished my story when they asked me if it still would be necessary to fight the rebels that night or in the morning. I shook myself gravely and said, 'Impossible to tell!'

"Through the assistance of the military officers I reached my office at midnight at the 'repulsive' hospital's administration building. I was glad that every one greeted me with joy; they all thought that I was lost in the fight.

"At midnight the commandant came to my room—I was in my bedroom but not asleep—and thanked me for my prudence. He said that he saw me approach the rebels coolly, and he had watched how the rebels had suddenly followed me to the landing. He was sorry that the soldiers at the entrance had opened fire upon the men. I thought the commandant was making sport of me and that in reality he was about to put me under arrest for having led a portion of the mutinous crew towards the third harbor entrance. But I was wrong. He actually shook hands with me, and was about to leave me when a thought came to me that I could perhaps impose upon his innocence. I asked him if it would not be advisable for me to return to the rebels and arrange for their peaceful surrender. He informed me that it would not be necessary and that in the morning every rebel would be rounded up and accounted for. Troops were arriving as fast as trains could bring them. I did not wish to further detain the commandant. Meanwhile every few minutes or so a shot rang out from the direction of the parade grounds.

"I was beginning to become somewhat nervous about what the next day might bring about, and should the authorities discover that I had suggested to the rebel crew to return to their ships for the purpose of turning their guns against the Wilhelmshaven forts, I knew what my fate would be. So I called up the commandant's office on the phone and suggested that I be assigned to the station for the purpose of directing and advising the constantly arriving detachments to the critical point along the harbor front. He at once approved of my suggestion and informed me that if I stepped over to the headquarters he would furnish me with a 'night pass.' That was just exactly what I was wishing for.

"On reaching the station I learned that outside of a few desperate sailors, the entire rebel forces had surrendered and put themselves at the mercy of the government. I believed it must be so, as two regiments, which had reached the station yards only a few hours earlier, had already received orders to return to their depots.

"I boarded the train that left Wilhelmshaven at 4 o'clock in the morning, and without losing time reached the Swiss border, of course resorting to a different disguise—which, I think, is better not divulged just at this time." *Baltimore American*, 21/10.

GERMAN RAIDERS.—The British Admiralty is understood to have received reliable information that Germany will supplement her winter U-boat activities against shipping with speedy commerce raiders which will run amuck in the Atlantic and may operate sporadically off the American coast.

Vice Admiral William S. Sims, commanding the American naval forces in European waters, has already warned his command to be on the lookout for raiders flying neutral flags or otherwise disguised.

The Navy Department here is continuing a policy of the utmost vigilance against mysterious craft which appear near shipping lanes.

The general warning against raiders is regarded now as based on something more than the routine precaution which has heretofore been taken by the inter-Allied and American navies.

Not only have reports reached the British Admiralty concerning Germany's modified winter campaign on the high seas but in two instances the raiders have already put in an appearance.

On the first occasion they succeeded in sinking two British destroyers and the nine cargo ships of small tonnage which were being convoyed.

On the second occasion the British destroyers evened the score by sinking the German auxiliary cruiser *Marie of Flensburg* and 10 armed patrol craft in the Cattegat, an arm of the North Sea between Norway and Denmark.

This second encounter was an easy victory for the destroyers, despite the fact that the *Marie of Flensburg* had 6-inch guns, but the British Admiralty does not anticipate that subsequent operations along this line will be as simple.

Now that the Germans have apparently decided upon sea raiding as a policy to go hand in hand with U-boat activities, there is no telling to what lengths they may go in carrying it out.

Reports indicate that the Germans in this, as in other cases, have planned their campaign well in advance and have been quietly preparing it for some time.

The two main features of the German policy are understood to be, first, to use raiders to attack convoys of merchantmen, and second, to employ them in a sort of banque campaign on the high seas.

The first feature is giving the British Admiralty and the American Navy Department the most concern.

For some time cargo vessels—especially vessels of small tonnage—have been gathered in groups and sent out under convoys of destroyers.

Admiral Benson, chief of naval operations, has already explained how his plan worked effectively for groups of vessels crossing the Atlantic. Less than one-half of 1 per cent of American ships have been sunk, he explained, under the general plans which included this feature of defence.

But the plan admittedly was not calculated to meet the especial danger of the attack from raiders.

It was believed that if a U-boat sought to attack any such group it could only hope to get one or at most two of the group before being driven off or destroyed by the convoy.

But the raiders have already demonstrated on one occasion that if they can account for the convoy, the merchant craft are all easy prey.

Destroyers are the logical enemy of the U-boats, but are, generally speaking, not able to cope with raiders armed with 6-inch or heavier guns. In other words, the destruction of the *Marie of Flensburg* by destroyers was an exception.

There are hundreds of ships in such neutral ports as Rotterdam, for example, which might put to sea and become speedily transformed into German commerce raiders.

These vessels are used for the Rhine trade or are lying idle and there is no reason why they could not be utilized by Germany for war purposes in pursuance of any set plan for commerce raiding on an extensive scale.

It would be a violation of Dutch neutrality for German ships to become transformed into auxiliary cruisers at Rotterdam and then set out against the enemy. This would constitute an armed expedition from Dutch soil against nations with which Holland is at peace.

But there is no violation of neutrality involved in putting arms aboard these vessels and then sending them to sea to have them equipped as auxiliary cruisers after they leave port.

Shipment of arms is permitted under international law. Germany has a perfect right to ship arms in any number of ships from neutral ports.—*Washington Post*, 5/11.

ADMIRAL VON TIRPITZ AND THE U-BOATS.—At a meeting of the new Fatherland party in Munich, November 11, Admiral von Tirpitz, formerly German Minister of Marine, made a violent annexationist speech. He said the question whether Germany or Great Britain became the protector of Belgium would be the decisive issue of the war.

"A mistaken solution of the Belgian question would stunt our exports and the reserve capital of our industry and degrade us to being the bond slave of Anglo-Americanism," said the admiral. "Our military security lies in Belgium. It is the only way of obtaining compensation for our enormous economic losses."

The admiral added that it was a mistake to believe the submarine would prove sufficient protection against Great Britain, as some effective counter weapon was bound to be discovered. He declared Germany must have Antwerp, that Austria must become the principal protecting power of the mouth of the Danube and that Germany was interested in the settlement of the Adriatic question.

"Germany's struggle," he added, "is a terrific battle against the all-devouring tyranny of Anglo-Americanism."—*N. Y. Herald,* 13/11.

VICE ADMIRAL CAPELLE RETAINS POST.—The *Vossische Zeitung* says that in well-informed circles it is understood that the German Emperor has refused to accept Vice Admiral von Capelle's resignation as Minister of Marine.

The resignation of Vice Admiral von Capelle was announced unofficially a little more than a week ago, but there has been no confirmation that his resignation had actually been submitted. On the contrary, there were reports that the German chancellor, Dr. Michaelis, was ready to throw von Capelle overboard in order to save a difficult situation. More recently it was reported that a solution of the crisis was expected upon the return of the Emperor from Constantinople.—*Washington Post,* 24/10.

CRUISER "NÜRNBERG."—Among the vessels named as having participated in the rising at Wilhelmshaven is the light cruiser *Nürnberg.* The first ship of this name, a fast cruiser of 3450 tons, launched in 1906, was sunk in the action off the Falklands, in December, 1914, so that the present *Nürnberg* is evidently a brand new ship. It has been known for some time that Germany is naming many of her new ships after those lost in the war, and one of the first light cruisers launched in 1915 was called *Emden.* The *Frankfurt* and *Darmstadt* are other newcomers, which have been mentioned in unofficial reports of German naval activity. Nothing authentic is as yet known with regard to the characteristics of the latest German cruisers, but it is considered most probable that heavier guns have been substituted for the 4.1-inch weapons with which the pre-war ships were invariably armed. The *Regensburg* and *Graudenz,* which were making their trials on the outbreak of war, carried a new model of the 4.1-inch gun, 50 calibers long, of the semi-automatic type. Fixed ammunition was used, the magazine, containing six rounds, being attached to the cradle, and not recoiling with the gun. With this weapon a rate of 25 rounds a minute was possible. From the published description it was evidently an improvement on the Schneider-Canet automatic 12-pounder, introduced in 1906. The last named had breech mechanism on the principle of concentric screws, a semi-automatic movement being imparted by a hand lever and crank, with springs. A single motion of the lever opened the breech, ejected the empty cartridge, inserted a fresh round, and closed the breech. The firing was automatic or at the will of the gunner, and there were safety appliances to prevent discharge until the breech was completely locked. No less than 42 aimed rounds were fired in one minute at the trials of this gun. It does not appear, however, to have been widely adopted for service use, probably owing to the suspicion with which most naval officers view any weapon depending for its efficient working on more or less complicated mechanism that might fail at a critical moment.—*The Engineer,* 26/10.

U-BOAT NUMBERS CHANGED.—The Navy Department has found reason to make a drastic revision of its estimate concerning the number of enemy

submarines in operation. Officers who have the work of tabulating reports on the U-boat campaign were for some time puzzled by the fact that a German submarine bearing the number "50," for instance, would be reported as having attacked a vessel at one point on a certain date, and within the space of an hour, perhaps, would be reported as having sunk a neutral merchantman hundreds of miles away. By carefully checking these incidents an explanation was obtained. This is in effect that the German commanders have been ordered to change the numbers their craft display after each attack. Only the failure to confine certain numbers to each boat prevented the deception from being carried out for a much longer period.—*The Army and Navy Journal, 27/10.*

COAL SITUATION.—The coal situation in Germany may be summarized as follows: There is no lack of underground supplies of coal; production has decreased and will probably diminish still further rather than increase; no reserve stocks are available and none can be accumulated within a short time; the demands are great and will increase as winter approaches; and, on the other hand, owing to lack of transportation facilities, it will be impossible to ship all the coal mined and coal will accumulate at the mines again. In view of the dark outlook the cities are establishing local coal bureaus for the purpose of conserving their fuel supplies. Not only in Germany but also in Austria, which imports large quantities of coal from Germany, the fear is entertained that the supplies of fuel for the coming winter will prove insufficient, and various measures are being taken to conserve the existing stocks. Even in the Ruhr district, which is so rich in coal, and in the city of Essen, where no gas has to be manufactured as the coke ovens of the mines furnish an abundance of gas as a by-product, both coal and gas have to be conserved. The consumption of gas is to be reduced by prohibiting the use of gas stoves in dwellings, and it is expected that electric heating will be prohibited altogether.—*Shipping, 27/10.*

SIX MILLION MEN LOST.—Germany lost 6,000,000 men in three years of war, according to the declaration made in the reichstag by the Independent Socialist, Ledebour. A report of his speech reaching Washington through Switzerland states that, contemplating the prospects of a fourth winter campaign, the socialist leader said:

"You have not, evidently, gentlemen, an exact conception of what war means. We have had 1,500,000 dead, 3,000,000 or 4,000,000 wounded, of whom 500,000 are crippled for life, and 2,000,000 absolutely invalided. That makes it altogether 6,000,000 men lost during three years."

It is stated that official information confirmatory of these figures has been in possession of American officials for some time.—*Washington Post, 31/10.*

THE GERMAN MUNITIONS SUPPLY.—The war had not been in progress a month before it became manifest that the supply of ammunition for the artillery would constitute one of its greatest problems. Among the various theories suggested in explanation of the sudden check in the German advance on Paris, not the least plausible is that which ascribed it to a deficiency of shells for the field guns. In the first weeks of the campaign the hostile fire was overwhelming. Not only did the Germans possess an immense numerical superiority in guns, but apparently no limit was set upon their rate of fire. A Swiss military journal has stated that by the last week of September, 1914, *i. e.*, less than two months from the opening of the conflict, upwards of one thousand German field pieces had been withdrawn from the front in a worn-out condition and sent to Essen for repair. As the "life" of a field gun is estimated at many thousand rounds, this statement, if authentic, gives a vivid indication of the volume of fire that the Allied troops had to endure in those fateful days. Nor was it only in field guns that the German predominance was so marked. Where the

Allies were using heavy howitzers singly, the Germans employed them by batteries, and the German weapons were, as a rule, of superior caliber. Thus during August and September, 1914, the enemy enjoyed an indisputable supremacy in artillery fire, not only in the west but along the Russian front as well, for it is well known that Hindenburg's spectacular victory among the Masurian lakes was due almost entirely to the crushing weight of his gunfire. At the battle of the Marne the German bombardment, though still intense, was perceptibly less than it had been during the Anglo-French retreat, and from then to the following spring the German batteries, both heavy and light, were compelled to practice an unaccustomed economy. At that time our military authorities were not yet fully alive to the vital importance of the artillery arm, and for this lack of perception our troops at the front suffered heavily. But the insistent call for shells was at last heard, and the response was, and still is, on a scale which represents one of the greatest achievements in the history of our national industry.

For the last twelve months artillery supremacy on the western front has rested with the Allies, and official and private reports leave no doubt that it has been steadily increasing ever since the Somme offensive. Each of those wonderful thrusts against the main German rampart in Flanders which Sir Douglas Haig has been delivering since August was preceded by a bombardment so tremendous that the best war correspondent has found his vocabulary utterly unequal to the strain of describing it. Our troops now go "over the top" behind a barrage of almost equal intensity, while at the same moment another hurricane of fire is descending upon the hostile batteries. In the absence of reliable figures we cannot even guess at the prodigious expenditure of powder and shell involved by these tactics. It is enough to know, however, that at no time within the past year has our artillery been handicapped in the smallest degree by a dearth of ammunition. We are continually adding to the number of our guns of every caliber, and technical improvements now enable these weapons to be worked more rapidly than ever, yet the supply of shells keeps pace with the expenditure. Furthermore, we have made large contributions to the artillery resources of our allies, and it was gratifying to hear General Cadorna's eulogy of the excellent work performed by our heavy batteries on the Isonzo front. But if the Allies have gained the upper hand in the vitally important element of gun power, it would be wrong to suppose that the enemy has made no effort to retrieve his lost supremacy. On the contrary, the German industrial system has for a year or more been driven at its utmost capacity, under a scheme of national service which in scope and thoroughness far exceeds the most drastic proposals that have been made on this side. It is difficult to obtain exact particulars, but we gather that the entire male population of Germany between the ages of 18 and 50 is now under compulsion to serve either in the fighting forces or in the war factories. The women, too, are no longer free agents, though it is not quite clear how far the compulsory system has been extended to them. It is known, however, that the adult female dependents of men at the front are virtually forced to do war work under threat of having their separation allowances curtailed. The Bureau of War Service, which came into existence in October, 1916, is in charge of General Groener, who appears to possess arbitrary powers over that section of the community which is not immediately controlled by the military administration. The German national-service scheme, first promulgated a year ago, actually came into effect last February, the interval having been utilised to erect a large number of munition factories and to adapt existing establishments to war needs. So far as we can judge, the organizing work was carried out with success. Where the difficulty lay was in securing an adequate supply of raw material. But even in this respect German resources are very considerable. The labor difficulty was solved in part by the simple expedient of forcing the civilians in the occupied territory of France and Belgium to work in the

German factories or on the land, thus releasing thousands of German men and women for the munition service. Germany's problem, it should be remembered, is not so complicated as our own. For the time being she has no occasion to go in for shipbuilding on a large scale, except in so far as submarine construction is concerned, and is thus able to devote her main effort to the output of such material as represents a distinct contribution to battle strength. Guns, shells and aircraft seem to be the principal items in the German program. As regards the former, accounts from the front make it clear that the hostile fire, though neither so intense nor sustained as our own, is still very formidable, and were it not for the excellent counter-battery work of our artillery, aided by the skill and gallantry of the airmen, we should find the conquest of Flanders a far costlier operation than is fortunately proving the case. As for aircraft, we should say that the German position has undergone a notable improvement since the early part of the year. By June Sir Douglas Haig was reporting the presence of large enemy air formations along his entire front. Vanquished by the individual audacity of our aviators, the Germans sought to redress the balance by sheer weight of numbers, and thus it has become a common sight to witness squadrons of 30 or 40 machines attempting to cross our lines. On other fronts the German aerial effort is scarcely less vigorous. For instance, hundreds of machines are being employed in the Riga section, where the Russian bulletins bear witness to the enemy's incessant activity in the air. Here at home we have had reason to learn that, however urgent the requirements of the front may be, Germany has contrived to accumulate a reserve of powerful machines for what Lord Derby has aptly termed a "political" air offensive. We note, also, a message from Holland to the effect that the Dutch war office has purchased a dozen German military machines of the latest type, and intends to place a large contract for similar machines in the near future. All of which suggests that Germany has mobilized her industries to some purpose.

It must not, however, be forgotten that her success in this direction has been due in large measure to the policy of preparation for war which she has pursued for nearly a generation. To take only the 10 years preceding 1914, we should say that her output of armament material, irrespective of warships, was as great as that of Britain, France and Russia combined. Besides the Krupp establishments there were many state arsenals in Prussia, Saxony and Bavaria continuously at work, the magnitude of their output bearing no relation to the normal requirements even of Germany's vast armaments. Thus she began the conflict with an immense stock of munitions already in hand, and the state factories in every part of the country provided the nucleus of the comprehensive industrial organization for war purposes which we see in operation to-day. Unless due weight is given to the pre-war conditions in the respective countries, full justice cannot be done to the achievement of our own industry in overtaking the long German lead. For several months now the German output appears to have been at its maximum, yet we have still kept ahead and have not yet reached our own limit. What, then, will happen when the United States has completed the mobilization of its manufacturing resources, and when the workshops of the Union, from Atlantic to Pacific, are pouring forth arms, ammunition and equipment of every description? The future will show, but we venture to think that it is a future which every intelligent German must view with the liveliest dread.—*The Engineer*, 10/10.

PUBLIC OPINION.—The Rome newspaper *Informazione* recently published a statement from a Swiss correspondent that there is not a single person in Germany who genuinely believes any longer in the success, or even the usefulness, of the unrestricted submarine campaign. The continuation of the campaign and the official boasts about its efficacy are due to the fact that the German Government dare not confess its failure, because of the terrible effect it would have upon civilian discipline in Ger-

many. The dispatch points out that the German people can hardly have failed to recognize the significance of the figures issued every week by the British, French and Italian governments, showing the number of vessels entering and leaving the ports of those countries, these figures showing little or no diminution since the commencement of unrestricted submarine warfare. The German people now realize that instead of bringing the war to a speedy end, as was promised, the submarine campaign has only aggravated it, creating for Germany new enemies in all parts of the world, notably the United States and China. Finally, the submarine campaign has completely failed to bring about the starvation of Great Britain. On the other hand, it has led to a marked tightening of the British blockade, which is rendering it impossible for neutral countries adjacent to the Central Empires to send any considerable supplies of foodstuffs to Germany and Austria.—*Shipping*, 10/11.

GREAT BRITAIN

H. M. S. "DRAKE."—The circumstances under which H. M. S. *Drake* was sunk off the coast of Ireland were such as to reflect credit on the fine workmanship put into this vessel at Pembroke dockyard, where she was built. Although hit by the torpedo in a vital spot, she remained afloat long enough to be towed into shallow water, and could probably be raised without much difficulty if her value warranted the cost of the work, which is doubtful. The armored-cruiser type, as a whole, has been far from successful during the war. Germany has lost six out of a total effective establishment of seven, and our own losses in the corresponding class have been heavy. They fall easy victims to the fire of modern artillery, while their great length and unhandiness make them attractive targets for torpedo attacks. It seems, therefore, that the armored cruiser has definitely lost its place in the naval organization.—*The Engineer*, 26/10.

SIR ERIC GEDDES DECLARES U-BOATS BEING MASTERED.—Striking statistics as to the results of the German submarine war and England's efforts to combat it by naval activity and acceleration of ship construction were given by Sir Eric Geddes, First Lord of the Admiralty, in the House of Commons to-day.

Unusual importance attached to his statement, which was the first he had made in Parliament, because of recent outspoken criticism of the navy, especially since the successful German attack on a convoy in the North Sea.

Near the outset of his speech Sir Eric announced that between 40 and 50 per cent of the German submarines operating in the North Sea, the Arctic and the Atlantic since the beginning of the war had been sunk. During the last quarter, he added, the Germans had lost as many submarines as they lost in 1916.

Enemy submarines were being sunk to an increasing extent, but the Germans were building them faster than they had done hitherto.

Referring to the question of publishing the tonnage of British merchantmen lost through submarines, he said he had made a careful investigation and had approached the subject with the idea that it ought to be possible to give the public figures, because, he added, "it is hardly conceivable that the enemy does not know what he is sinking."

He regretted to say, however, that he had not found it possible to arrive at any form of publication which would not convey valuable information to the enemy, which he did not now possess, if information were given in regular sequence for specific periods.

"I have studied from a variety of sources," said the First Lord, "the statements made from time to time by the enemy as to tonnage and position, and have come to the definite conclusion that not only does he not know

what is being sunk, but that he would like very much, indeed, to know what is being sunk regularly month by month or week by week, or even exactly for a period."

Sir Eric, supplementing the recent statement by Premier Lloyd George in Albert Hall, said that he could give certain information which would show that "we are making reasonably satisfactory progress in overcoming the menace of submarine activities."

He added that the House would realize that "however great the loss of mercantile tonnage is" (and the figures are still very formidable) "we cannot at this stage of the war pick any one item to deduce therefrom that the war, even any phase of the war, is going well or badly."

The kaleidoscopic change, which goes on in actual warfare, he added, is continually occurring in workshops and shipyards. To the uninformed observer it must appear sometimes that there is no method in the madness of those who control these matters.

"But," said he, "I would appeal to the country for confidence. There is a method in what we do.

"The general situation regarding submarine warfare can best be demonstrated by the following figures: Since the beginning of the war between 40 and 50 per cent of the German submarines operating in the North Sea, the Atlantic and the Arctic Ocean have been sunk. During the last quarter the enemy has lost as many submarines as during the whole of 1916.

"As regards the sinkings of British merchant tonnage by submarines, the German official figures for August are 808,000 tons of all nationalities. They sank a little more than half of that for all nationalities.

"For September their official figures are 679,000 tons. They sank far less than one-third of that amount of British tonnage, and less than one-third of that amount of all nationalities.

"The Germans claim that our tonnage is falling so low that there are not enough ships on the sea to enable their submarine commanders to maintain their bag. Let me give you facts.

"In April last, the heaviest month of British losses by enemy submarines since the war began, our trade flowed presumably in satisfactory volume for the enemy submarines. In September last, his lowest month of sinkings, our overseas sailings of all ships of over 1600 tons were 20 per cent in number and 30 per cent in tonnage higher than in April. The enemy must therefore find another and better explanation for his lack of success. I can supply it.

"The explanation is that the long arm of the British Navy reached down into the depths, and thus the harvest reaped is poorer and the number of German submarines which do not return is increasing.

"Since April, the highest month for British losses, they have steadily decreased, and latterly to a marked degree. September was the most satisfactory month; October was only slightly worse, and better by 30 per cent than any other month since unrestricted submarine warfare began. The net reduction in tonnage in the last four months is 30 per cent less than anticipated in the estimate prepared for the Cabinet early in July.

"The total net reduction since the beginning of the war from all causes in British tonnage on the official register in ships over 1600 tons is under 2,500,000 of tons gross, or 14 per cent, and that after a period when our great armies and their magnificent equipment received priority, and the great growth of our navy was simultaneously achieved, to the detriment of mercantile shipbuilding.

"Now that the submarine is for the present doing less damage and the resources of the country are again being devoted to a far greater and an increasing extent to the upbuilding of the mercantile marine, I look for net results still more formidable.

"Summarized, the submarine warfare amounts to this: Our defensive measures have during the last seven months proved so efficacious that in spite of the increased number of ships which are passing through the

danger zone, there has been steady reduction in the damage done by the enemy submarines. In the meantime we are sinking enemy submarines to an increasing extent. Our offensive measures are improving and will still more improve and multiply.

"But, on the other hand, the Germans are building submarines faster than they have hitherto done, and they have not yet attained their maximum strength. It appears to me, therefore, that in the submarine warfare, as elsewhere, it is becoming a test of determination and ingenuity between the two contending forces.

"For the present I have come to the conclusion that the submarine warfare is going well for us. The enemy has done less damage than he hoped and less than we estimated. He has done it with a serious and heavy loss to himself. At present we may be justified in feeling that his attack on our trade is held and is being mastered and we are justified in looking to the future with courage and determination, confident that he will fail."

The First Lord said that it was interesting to recall the position of the German mercantile marine. He went on:

"At the outbreak of the war Germany possessed over 5,000,000 tons of shipping. To-day nearly half of it has been sunk or is in the hands of ourselves or our allies. She has a 50 per cent reduction to our 14 per cent.

"It is well that the British public should be told what they are up against. We must not consider ourselves alone, but the alliance as a whole."

He pointed out that while Great Britain has plenty of coal for victory, Italy and France have not, and it was essential that there should be the greatest possible economy in food and in all imports in order that tonnage should be saved so that it might be diverted to other vital needs of the alliance. He added:

"We must lay our plans for a long war. I see no signs of its being a short one, and all by their economy can help the navies of the Allies defeat the submarine."

Sir Eric urged Britons to do their utmost, as there were greater calls upon the shipping world.

"The huge army of the United States," he said, "is preparing and has to be transported and maintained. The French, Italian and other allies require seaboard help. That help can only be given if the nation is prepared strictly and rigorously to curtail its needs, develop home resources and conserve its present potential maritime strength."

It had been asked, he said, whether Great Britain was building merchant tonnage at a sufficient rate to replace the sinkings. The answer, he said, had been given negatively, but it was unsound and inconclusive to take any one factor of output as against losses to be a vital indication of Great Britain's situation. Britain, he said, was now equipped on a scale never dreamed of before.

"May the country not justly take credit for the fact that in 1917, with our military and munitions effort at the maximum, and when the call upon man-power has reduced our available resources to a minimum," he continued, "we shall have produced naval and mercantile tonnage prectically equal to the best year ever recorded in our history? And in 1918 it will certainly be very much greater."

The speaker expressed confidence that the skilled workers would stand by the nation in carrying out the great shipbuilding program, just as they had done in the munitions and other needs of the country.

"For," he added, "They may rest assured that the Parliament and the country will not permit any action calculated to lower the standard of comfort they have won for their families and themselves."

Sir Eric said that the new national yards now being built would be ready in six months, and continued:

"The output of merchant tonnage for the first nine months of 1917 is 123 per cent higher than the total output for the whole of 1915. Standard

vessels have been ordered representing nearly 1,000,000 gross tons. More than half of these are under construction."

According to the First Lord there were now 235 large drydocks in the British Isles where merchantmen could be repaired. He expressed the hope that all these vessels would soon be effectively armed, and he paid a tribute to the women employés in the dockyards.

Replying to criticism regarding the loss of the Scandinavian convoy in the North Sea, Sir Eric said that had the British Navy been informed of the attack, which it was not, its position was such that it could not have wished a better opportunity of intercepting the raiders.

The Scandinavian convoy system had been going on since April, he added, and this was the first occasion on which any ship had been lost.

To those who had complained that the fleet had not been sent to assist Russia he stated that such an operation would occupy considerable time and that there were extensive mine fields. Responsible naval opinion was unanimous that the step was not one which should be taken.

Referring to the success of the convoy system in general he said:

"In September 90 per cent of the total vessels sailing the Atlantic trades were convoyed, and since the convoy system started the total percentage of loss per convoyed vessel through the danger zone was 1 in 200.

"I wish to acknowledge fully the valuable contribution made by the United States Navy in this convoy work since their destroyers joined us under command of Vice Admiral Sims, from whom we have received the heartiest cooperation, and whose counsel has been of great value to us. The contribution of the United States Navy was given promptly and freely upon their entry into the war, and is gradually being extended in this and other ways.

"As is known, we have had most valuable consultation with Admiral Mayo, and on the occasion of his visit took counsel with him as to the rôle the American Navy was to play. We also took advantage of his visit to have an International Naval Conference, from which we hope much good may result."

Defending the navy, the First Lord reviewed its accomplishments in the war, declaring that, unlike the enemy forces, its rôle was an offensive one.

"During a recent month," he continued, "the mileage steamed by our battleships, cruisers and destroyers alone amounted to 1,000,000 ship miles in home waters. In addition to this, the naval auxiliary forces patrolled more than 6,000,000 miles in the same period and territory.

"The displacement of the navy is 75 per cent greater than in 1914, when it was 2,400,000 tons. At the outbreak of the war we had 18 mine sweepers and auxiliary patrols, to-day there are 3366. The personnel of the fleet before the war was 146,000, to-day it 300,000."

The First Lord announced his decision to add another civil Lord, because he had found this necessary to carry out the increased work.

"I hope to make an appointment shortly," he said. "The board will then consist of eight naval officers and four civilians, including myself. An important change has been made in the arrangements dealing with Admiralty business. The members of the board have been grouped into two formal committees (Operations and Maintenance), each meeting once a week or more, if necessary. The First Lord is ex officio chairman of both committees, and personally I make a point of presiding over them as often as possible."

Sir Eric announced that it had been decided that Vice Admiral Wemyss, as Deputy First Sea Lord, would give his whole attention to naval staff matters. Further additions had been made to the naval staff with the object of strengthening its control over operations.

"A new section," said the First Lord, "consists of younger officers, who, it is hoped, will add strength to the valued experience of the older officers. I look with confidence to the great advantages of this new arrangement."—*N. Y. Times*, 2/11.

BRITISH FLEET NOT HIDING.—The British Admiralty, replying to the German Secretary of the Navy's criticism of the recent speech in the House of Commons by Sir Eric Geddes, First Lord of the Admiralty, said:

"The world knows from the Cattegat events that the royal navy is waiting for the high seas fleet, which still continues to decline battle. No German war vessel larger than a destroyer has shown itself to us 150 miles west of Helgoland from August, 1916, to September (October?), 1917, when two light cruisers attacked a Scandinavian convoy."—*Washington Post*, 10/11.

WORK OF NAVY LAUDED.—Thirteen million men have crossed and recrossed the seas during the three years of the war—and only 3500 of these have been lost, Premier Lloyd George told the House of Commons, October 29, in lauding the work of the navy.

"The navy has also safeguarded the transportation of 25,000,000 tons of explosives and 51,000,000 tons of coal," the Premier continued.

"Th navy is the anchor of the Allied cause. If it loses its grip the hopes of the alliance are shattered."—*The Star*, 29/10.

THE FIRST LORD OF THE ADMIRALTY CRITICIZED.—Comment in the press on the statement of Sir Eric Geddes, First Lord of the Admiralty, in the House of Commons is not entirely favorable.

The *Daily Mail* says that Geddes appears to have forgotten that criticisms of the loss of the convoy were based on the report issued by the Admiralty "which was of an obscure and very unmilitary character." It adds:

"The First Sea Lord was parodying the critics when he argued that the only method of supporting Russia was to send the British battle fleet to the Gulf of Riga. Nor can we accept his version of our own criticisms of the Admiralty as anything more than an entertaining burlesque of what we said. The fact is that the Germans, though their battle fleet is hidden away, are nevertheless forcing the fighting. People are apt to forget this merely because they think in terms of battleships and the battleships are not in action. What has to be recognized is that in a war in which battleships have to be kept, as it were, under glass cases, a great deal of revolutionary and original thinking has to be done. It can best be done if the freshest and most active brains on the Admiralty Staff are given more freedom than they have hitherto enjoyed."

The *Times* says:

"Geddes's answer to the frequent suggestion that the grand fleet or some portion thereof should have attempted to tackle the German forces which covered the enemy landing on the islands in the Gulf of Riga was convincing and complete. We have never given currency to these theories of Baltic strategy. If they ever had any right to be heard, they at any rate have been long removed from the domain of practical possibilities.

"As for the raid on the convoy in the North Sea we never regarded it as other than one of those untoward incidents which have been inseparable from naval warfare in all ages. It was a case of chance and bad luck which leaves no slur on the efficiency of the royal navy."

The *Morning Post* says:

"We hope those members of the House of Commons who thought fit to attack the Admiralty because the convoy was lost will now have the grace to acknowledge, if only to themselves, the injustice and folly of their conduct. Because the Admiralty did not choose to inform the enemy of the details of the convoy system their detractors arrived at the remarkable conclusion that it was a total failure.

"As there will probably be more losses, such incidents being unavoidable in war, it is well that the position should be understood. The fact is, as the First Lord observed, that the greater part of the work of the navy must be done in secret. It is easy enough to take mean advantage of that

circumstance to insinuate for ulterior reasons that the navy is not doing its duty. Fortunately for the country the public takes the just and generous attitude of confiding in a service which has never yet betrayed its trust."

The Daily Telegraph, The Daily News, The Daily Chronicle and *The Daily Express* are dissatisfied with Geddes's statements as to submarines and ship construction.

The *Telegraph* complains that past ministerial optimistic estimates on production have not been realized and that the shipping situation is becoming graver and graver.

The *News* thinks that Sir Eric put a too rosy construction on submarine figures, and says the speech did not succeed in removing obstinate questions as to whether the utmost use is being made of the naval and intellectual resources at the navy's command.

The bulk of the press comment accepts and indorses Sir Eric's explanation of the reason why the British fleet did not try to enter the Baltic and also his statement on the convoy incident.

Appreciation is expressed of the new distribution of affairs of the Admiralty, tending toward decentralization, and also the introduction of younger men. This, it is contended, ought to be justified by results, although the *Times* points out that success will depend on the choice of men.

Some of the speakers who followed the First Lord in the House of Commons frankly disagreed with him. George Lambert, former Civil Lord of the Admiralty, said the navy was not being used to the best advantage, and he knew that distinguished strategists agreed with him.

Richard Holt and Robert P. Houston, prominent ship owners, claiming personal knowledge of submarine losses, challenged Sir Eric's figures about the sinking of merchant shipping. Mr. Houston figured that the Allies and neutrals have lost 8,000,000 tons during the war. Mr. Holt refused to accept the First Lord's figures and said that the Admiralty's policy of concealment was sapping the country's confidence in the government.—*N. Y. Times*, 3/11.

CRITICISM OF BRITISH ADMIRALTY.—The *London Daily Mail* says editorially: "We publish an important article on the Admiralty, by Admiral Henderson, whose name carries the greatest weight with all thoughtful officers of the royal navy. For the last 31 years he has been known as a constant advocate at the War College of an efficient war staff. He saw, more than 30 years ago, that modern war was such a complicated business as to require special machinery for its conduct, if our fleets were to be directed to victory. His work was watched with extraordinary sympathy by the late Admiral Mahan, who was one of his warmest friends. It is almost tragic to reflect that we have been engaged in naval war for three and a half years, yet have not made the changes which, as Admirals Henderson and Mahan saw, urgently were required in 1886. Admiral Henderson's article is written with masterly insight and knowledge, and brings out clearly two main facts. The chief command of the British fleet at the battle of Jutland was defective in energy and decision. The greatly inferior German fleet was allowed to escape when it ought certainly to have been destroyed.

"After dealing with the battle of Jutland and alluding to the signal failure of the Admiralty to aid Russia in the Baltic, Admiral Henderson takes up the loss of the convoy in the North Sea, where the same qualities were revealed by the British high command. The fact is, of course, that the same officer who was commander-in-chief at the battle of Jutland is now First Sea Lord. Admiral Henderson in thoughtful, measured criticism cannot but press home with redoubled emphasis the question: Have the recent changes at the Admiralty gone far enough and high enough? The admiral says: 'We have not yet found the men or set of men for the Admiralty of instinctive genius for carrying on our naval share of the

war and making full use of the splendid fighting spirit of the officers and men in our very great preponderance of the naval forces of the Allies.

"'First, take the battle of Jutland. The Germans claimed this as a victory and so did we. It was a victory for neither side, only an inconclusive action in which the strategical and tactical honors fell to them, and it is no use denying it. They gained their object of avoiding a decision and getting back to port, while we failed to take advantage of their discomfiture and missed the chance of our object, that of destroying them, by our failure to understand and apply the principles of either one or the other, or both. We missed it because, at the critical moment, when the torpedo attack threatened our rear squadron—which was the only fleet in touch with the enemy, the leading squadron being in advance of it and not engaged—our whole fleet was turned several points away, as stated by the Germans, instead of the squadron affected. Precious minutes and touch with the enemy were lost, as stated in our own dispatch, because Beatty, who kept in touch with the Germans, was still engaged with the enemy and was unsupported, although he asked for support, and because no detailed touch was kept with the enemy fleet during the night. Its whereabouts apparently was unknown until morning, although it had passed during the night astern of our fleet and was already inside it and south of it at daylight. These are only some of the causes of our failure. That was a failure which ought to have been the subject of inquiry by a court-martial. Such inquiry may yet be demanded when free discussion of the events of that battle becomes possible.

"'Another instance is the destruction of the convoy last week, which has already stirred public opinion and led to a request for an inquiry by the House of Commons.

"'The Admiralty communication, which would take in no one but a landlubber, states: "The enemy cruisers succeeded in evading the British watching squadron on the long, dark night, both in their hurried outward dash and homeward flight," but this does not imply there was any determined attempt to cut them off on the way home. As the distance from Helgoland to the scene of the attack is approximately 434 miles, and some time must be allowed for transmission of information and orders, it would, allowing 15 hours, have necessitated a speed of 29 knots. This inclines one to the opinion that the enemy was previously at the appointed rendezvous wating instructions, unless they have now craft of very great speed.

"'The episode shows the lack of instructed imagination at headquarters.'"—*Army and Navy Register*, 3/11.

BATTLE TANKS.—Colonel E. D. Swinton, of the British Army, is popularly known as the father of the tank, as he had the distinction of raising and commanding the first tank unit. To Colonel Swinton also is attributed the introduction of the expression "No Man's Land" in alluding to the strip between the first-line trenches. He won two decorations in the South African War and is a companion of the Order of the Bath. He has the Distinguished Service Order and is a chevalier of the Legion of Honor of France.

"The tank was conceived in September, 1914," says Colonel Swinton. "In the beginning of 1916 its extensive manufacture was started in one section of England, while the trying out and training of crews took place in other parts of the country. The advent of this new engine of war was kept very quiet. I would like to ascertain therefore what truth there is in the recent newspaper reports that a young dancer from Java was shot as a spy in Paris for having betrayed the secret of the creation of this new weapon.

"Concerning its name," he continued, "it might not be out of place right now to satisfy the general curiosity as to a minor detail by answering the question. 'Why tank?' Why should a fighting automobile have been so inappropriately named? The reply can be given in two short words—for secrecy.

"In its experimental stage the machine was known as 'land cruiser' or 'land ship.' But it is a military platitude that the 'element of surprise' —as it is called in the textbooks—has immense value in a way, and it was naturally realized that the greatest results to be expected from the employment of this new weapon would be obtained when it could be launched unexpectedly so that the enemy might be unprepared to meet it. And when it crystallized into a definite shape it became obvious that its original names were far too suggestive for the real thing. It was therefore decided to christen it by some non-committal word which would give no inkling of its nature to those 'not in the know,' and would at the same time be sufficiently descriptive and short to be readily adopted by all concerned.

"A large part of the earlier stage of the manufacture consisted of the rolling of steel plates and their assemblage and erection into boxes, which to all those who made a close examination might well be intended for vessels to hold water, petrol or oil. The fact that the boxes would be bullet proof would merely lend color to the idea that they might be intended to move up in the fighting zone. This theory would not be necessarily discredited even when the stage of fitting them with engines and caterpillar tracks was reached. It would not be until the time for mounting the armament that their real purpose must become plain, up to which moment an alias might to some extent conceal it. 'Reservoir' and 'cistern' were clumsy; 'tank' was equally accurate and shorter. And 'tank' it became."

As to the origin of the idea, Colonel Swinton says that the employment of a heavily armed and armored automobile for work as a land cruiser had its inception with the appearance in England of a tractor which had been built in Peoria, Ill., a machine primarily intended for hauling, and with no intention of going over hills and trenches. Some method of overcoming barbed-wire barriers was required, so from the ideas engendered by the American-built tractor was constructed the tank, which could force its way through any uncut wire, could carry guns sufficient to put any machine-gun battery out of action, and at the same time afford protection to the men who came up to disentangle the wire. And the crew was amply protected.

In answer to the question of what it is like to be in a tank, the colonel remarked:

"I should say that the motion of the machine is like a trembling glide, with less jerkiness than might be supposed. It is very hot inside and stuffy, and, added to this, there is the mixed odor of oils and gasoline. When the guns are discharged the atmosphere inside is naturally not improved by a certain amount of cordite fumes. On the whole, the discomfort is probably no worse than that of a stokehole of a battleship in action. The noise is somewhat deafening, of course, and when the tank is in action there also is the additional din and clang of the bullets which strike the steel plates. Even when descending a steep incline the tanks are very steady, as they do not run and do not travel down hill necessarily faster than they do on the flat. Motion is mostly felt when the machine is just on a ridge and tips slowly forward.

"Still," he added, "to be several hours continuously in action in a machine is extremely trying to the nerves and to the physique of the crew. Each tank is commanded by a skipper, who has his place in front alongside the driver, while the crew is distributed to the various guns. The original men selected for the tanks were picked for their knowledge of a motor, as well, if possible, as that of machine guns. A member of a tank crew has to be in good physical trim, and the smaller he is the better for the work.

"Members of the crew wear helmets as a protection if they bump up against the angles of the steel interior," he said. "All the men in a tank must of necessity have good nerves and the drivers must be almost 'trick drivers.' The art of tank driving is somewhat like horse riding or playing on an instrument. These things have a distinct individuality of their own.

"Perhaps there are reasons for the individuality. The tanks are divided into two classes, 'males' and 'females.' The 'male' is the machine-gun hunter and destroyer. He carries the light quick-firing guns capable of

firing shells. The 'female' carries nothing but machine guns. She keeps down hostile rifle fire, beats back counter attacks and rushes of infantry.

"These tanks can easily travel over rough ground, cross trenches, craters and other cavities and climb over such raised obstacles as parapets. They can tear through wire entanglements, uproot trees and throw down walls. And all this is accomplished while the enemy looks on. They are practically helpless. Only the large guns could destroy a tank, and by the time they get the range the tank would be on its way back to its own lines, having wrought enough destruction to render the Germans harmless, comparatively, and aid the British infantry in an advance. The day of the tank will be long."—*N. Y. Herald,* 28/10.

OFFICIAL REPORT OF OPERATIONS OF H. M. GUNBOATS IN MESOPOTOMIA FROM DECEMBER, 1916, TO MARCH, 1917.—The following dispatch has been received from Vice Admiral Sir Rosslyn E. Wemyss, K. C. B., C. M. G., M. V. O., late commander-in-chief, East Indies Station, covering a report by Captain Wilfrid Nunn, C. M. G., D. S. O., R. N., on the operation of H. M. gunboats in Mesopotamia from December, 1916, to March, 1917:

7th May, 1917.

SIR.—Be pleased to submit to the Lords Commissioners of the Admiralty the enclosed report on the recent operations in Mesopotamia rendered to me by Captain Wilfrid Nunn, C. M. G., D. S. O., R. N.

2. I take this opportunity of specially bringing to Their Lordships' notice the excellent conduct of Captain Nunn during the whole period that he has commanded the flotilla in the Tigris. Through force of circumstances this command devolved upon an officer of less standing than might have been otherwise expected, and he has shown himself under all circumstances not only to have been worthy of his responsible position, but to have carried out his duties with a zeal and dash worthy of the best traditions and to have shown a very remarkable capacity for command.

I am, sir, your obedient servant,
R. E. WEMYSS,
Vice Admiral, Commander-in-Chief,

H. M. S. "MANTIS," 21st March, 1917.

SIR.—I have the honor to submit the following report on the operations on the Tigris during the months of December, 1916, and January, February and March, 1917, which led to the capture and occupation of Baghdad by our forces on 11th March, 1917.

2. Our advance on the right bank of the Tigris began on 13th December, 1916, when our troops established themselves on the Shatt al Hai.

The general situation early in January was as follows:

On the left bank our forces were held up by the Turks in the extremely strong Sannaiyat position, while on the right bank we had advanced much further up the river. The Turks opposed to us were commanded by Khalil Pasha. They were well dug in in strong positions.

Very large improvements have been effected in the transport department, railways have been constructed, and a large number of river craft arrived.

A number of these, and also barges, were put together at Abadan and Basra, and the facilities for repairs much increased, and wharves constructed.

3. The gunboats at the Tigris front have cooperated with the army in many intermittent bombardments of the enemy positions, and some very good results have been obtained, besides frequently engaging enemy aircraft.

We have at all times received great help from the army, the artillery officers and staff being indefatigable in rendering the navy every assistance.

The 14th Kite Balloon Section, R. N. A. S., commanded by Commander Francis R. Wrottesley, R. N., marked for us on many occasions, besides the useful work it has done keeping lookout for the army.

Aeroplanes have also been frequently put at the disposal of the royal navy for spotting.

While keeping some gunboats at the Tigris front, I have also always, at the request of the military authorities, stationed others at various points on the line of communication, and two have been stationed in the Euphrates, in touch with the troops at Nasiriyah.

The following of H. M. ships[1] have been engaged in the operations at various times:

○ H. M. S. *Tarantula*, Commander Henry G. Sherbrooke.
○ H. M. S. *Mantis*, Commander Bernard Buxton.
○ H. M. S. *Moth*, Lieut. Commander C. H. A. Cartwright.
○ H. M. S. *Gnat*, Lieut. Commander E. H. B. L. Scrivener.
+ H. M. S. *Butterfly*, Lieut. Commander G. A. Wilson.
+ H. M. S. *Sawfly*, Commander G. F. A. Mulock, D. S. O.
+ H. M. S. *Snakefly*, Lieutenant R. P. D. Webster.
+ H. M. S. *Greenfly*, Lieut. Commander A. G. Seymour, D. S. O.
+ H. M. S. *Gadfly*, Commander E. K. Arbuthnot.
+ H. M. S. *Grayfly*, Lieutenant C. H. Heath-Caldwell, D. S. C.
+ H. M. S. *Stonefly*, Lieutenant M. Singleton, D. S. O.
+ H. M. S. *Mayfly*, Lieutenant R. H. Lilley, D. S. C.
+ H. M. S. *Waterfly*, Act. Commander Charles T. Gervers.
+ H. M. S. *Firefly*, Lieut. Commander C. J. F. Eddis.
H. M. S. *Flycatcher*, Lieutenant Hugh Lincoln, R. N. R.
+ H. M. S. *Scotstoun*, Lieutenant S. E. Nicolle.

---

[1] The following letter concerning the gunboat flotilla for the Tigris has been received by the editor from Mr. A. F. Yarrow, governing director of Yarrow and Co., Ltd.:

HOMESTEAD, HINDHEAD, SURREY, September 27, 1917.

The Editor of The United States Naval Institute Proceedings,
Annapolis, Maryland, U. S. A.

DEAR SIR.—I send you a copy of *The London Gazette* of the 21st instant, giving an account, from the naval point of view, of the expedition up to Baghdad.

Unless you are familiar with the order for the gunboat flotilla for the Tigris, I may tell you that Lord Fisher, when he was at the Admiralty, gave us (Yarrow and Co.) the order for all these boats by "word of mouth," there was not even a "scrap of paper" involved; and he gave us a free hand to design the vessels as we liked after we had studied the subject, and to get them finished with the utmost possible dispatch.

Those marked with a cross were designed and built by us at our works at Glasgow. Those marked with a circle we designed and gave out the orders to different firms to build.

They were all built working night and day.

Those that we built were sent out in pieces and put together at Abadan—which is on the Tigris just below Basra, near the Anglo-Persian Oil Company's works.

The larger boats which were built by other firms from our designs were either towed out or steamed out.

The smaller boats have a draft of 2 feet 6 inches, and the larger ones 4 feet 6 inches.

The speed of the smaller is 10 knots, and the larger 16 knots.

I am not allowed to give you particulars of the armament.

This is an illustration of the benefit of entrusting firms with a free hand and avoiding the usual "red tape."

Had it not been that our firm was entrusted with a free hand it would have been impossible for the vessels to have been built, shipped out and put together in time to be of service to the expedition.

They were ordered in February, 1915.

Yours faithfully,
(Signed) A. F. YARROW,
Governing Director of Yarrow and Co., Ltd., Glasgow.

4. Operations proceeded in a most satisfactory manner, and early in February our forces were in possession of the right bank as far as to the westward of Kut el Amara, with bridges over the Hai, large numbers of prisoners having been taken, guns captured and heavy loss inflicted on the enemy.

After intense bombardment, in which the gunboats cooperated, a successful assault of the Sannaiyat position was made on 22d February, and a footing obtained in the Sannaiyat position. During the night of the 22d-23d dummy attempts were made to cross the river in various places above Sannaiyat, and just before daybreak of the 23d covering parties were rowed across the Tigris near Shumran in pontoons, a surprise landing effected, and a bridge thrown across.

By evening the infantry of one division had crossed, and another followed, the enemy trying ineffectually to stem the British advance on the Shumran peninsula.

Meanwhile our troops were pushing forward boldly through the Sannaiyat position.

The whole Turkish position was manifestly becoming untenable, and they commenced a general retreat, which developed later into a rout.

5. I was present at the operations on board H. M. S. *Tarantula*, and later on on board H. M. S. *Mantis*. H. M. ships *Moth*, *Butterfly*, *Greenfly*, *Gadfly*, *Snakefly*, *Waterfly*, *Flycatcher* and *Scotstoun* were also present at the front from time to time, and H. M. S. *Gnat* rejoined me on 4th March.

6. On the forenoon of 24th February I moved up river with *Tarantula*, *Moth*, *Mantis*, *Butterfly*, *Gadfly* and arrived at Kut el Amara at 9.30 p. m., where I landed and hoisted the Union Jack.

The town was deserted and in ruins. Early on the morning of the 25th I moved on up river and communicated with our troops near Shumran.

Floating mines had been seen in the river but were easily avoided.

7. During the morning I received a message from the army commander asking me to cooperate in pursuing the retreating Turkish Army, and I pressed on up river. We were abreast of our leading infantry at about 9.30 a. m. and in sight of the Turkish rearguard, on which we at once opened with rapid fire, inflicting heavy casualties. This the enemy soon returned, opening an accurate fire on us with field batteries, and several 5.9 howitzers from a prepared position among the sand hills in the neighborhood of Imam Mahdi. Our troops were advancing, and some of our field artillery considerably relieved the situation by the rapidity with which they came into action.

The battle continued during the day—all ships being hit by splinters of shell, but luckily no serious damage was done.

Lieutenant John H. Murdock, R. N. R., of H. M. S. *Mantis*, was somewhat severely wounded in the afternoon.

8. The enemy evacuated their position during the night, and we pushed on with the army in pursuit on the morning of 26th February.

It soon became evident that the Turkish Army was much demoralized, and I received a message by W/T from General Sir F. S. Maude during the forenoon to push on and inflict as much damage as possible.

We proceeded at full speed in *Tarantula*, leading *Mantis* and *Moth*, H. M. ships *Gadfly* and *Butterfly* following at their utmost speed.

My flotilla passed the small town of Bghailah at 2 p. m. White flags were flying over the town, and later on Commander Ernest K. Arbuthnot, of *Gadfly*, hoisted the Union Jack over the town, bringing in also about 200 prisoners and some trench mortars.

9. Just above Bghailah we now began to come up to numbers of Turkish stragglers on the left bank of the Tigris, and some guns partially submerged in the river, where they had been abandoned. We opened fire on all who did not surrender.

The smoke of steamers had been seen ahead, and we were soon able to distinguish several steamers, including H. M. S. *Firefly*, which we had to abandon on 1st December, 1915, when her boiler was disabled by a shell

during the retreat from Ctesiphon and we were surrounded by the Turkish Army.

We shortly afterwards got into gun range of the small shipping and opened a heavy fire, particularly on *Firefly* and the armed enemy ship *Pioneer,* who both replied. The *Firefly* made some good shooting at us with her 4-inch gun.

10. The Turks retreating on the left bank were becoming more numerous; they now had our cavalry division in pursuit of them on their right flank and the gunboats on their left.

The enemy were firing at us from three directions, and on approaching Nahr Kellak bend I observed a large body of enemy on the left bank at the head of the loop in the river, and gave orders for all guns to be fired on them.

They proved to be a strong rearguard, and opened on us with field and machine guns and heavy rifle fire. At this close range there were casualties in all ships, who were all hit many times, but our guns must have caused immense damage to the enemy, as we were at one time firing 6-inch guns into them at about 400 to 500 yards.

Besides the Turkish artillery there was a large number of enemy with rifles and machine guns behind the bend at a range of about 100 yards from the ships.

In the act of turning round the bend shots came from all directions, and casualties of *Moth,* which came last in the line, were particularly severe.

There were casualties in all three ships. *Moth,* which was magnificently handled by Lieut. Commander Charles H. A. Cartwright, who was himself wounded, had three officers wounded—all severely—out of four, and two men killed and 18 wounded, which is about 50 per cent of her complement.

She was hit eight times by shell—one from ahead hit the fore side of stokehold casing, burst and pierced the port boiler, both front and back, but luckily missed the boiler tubes. The after compartment was holed below the water-line, and the upper deck and funnels of all ships riddled with bullets.

The quartermaster and pilot in the conning-tower of H. M. S. *Mantis* were killed, but the prompt action of her captain saved her from running ashore. I consider that the excellent spirit of the men and skillful handling of the ships by their captains in a difficult and unknown shallow river were most praiseworthy.

11. We thus passed the enemy rearguard, and large numbers of the retreating Turkish Army were on our starboard beam. I opened rapid fire from all guns that would bear (this included heavy and light guns, pom-poms, maxims and rifles), and at this short range we did enormous execution, the enemy being too demoralized to reply, except in a very few cases.

We were also able to shoot down some of their gun teams, which they deserted, and several guns thus fell into the hands of our forces when going over this ground.

12. The vessels ahead were now in easy range, and several small craft stopped and surrendered, including the armed tug *Sumana,* which we had left at Kut during the siege, and had been captured at the fall of that place.

About 5.20 p. m. the large Turkish steamer *Basra* stopped and surrendered when brought to by a shell from H. M. S. *Tarantula,* which had, I was afterwards informed, killed and wounded some German machine gunners. The *Firefly* kept up a heavy fire from her 4-inch gun, but our reply began to tell on her, and having been hit several times she ran into the bank and fell into our hands about 6.15 p. m. in the northwest part of the Zaljah reach, to westward of Umm al Tubul.

The *Pioneer,* having been badly hit by *Mantis,* was in flames near her, and some barges laden with munitions in the vicinity.

The Turks had endeavored to set fire to the *Firefly's* magazine, but we were able to put it out and took possession of her at once, and I put a prize crew on board and hoisted the White Ensign.

Darkness now came on, and I considered it inadvisable to go on further, as we were far ahead of our troops.

I placed Lieutenant John P. Bradley, R. N. R. (of H. M. S. *Proserpine*), in temporary command of H. M. S. *Firefly*, with a small crew, and we moved out of the way of the burning *Pioneer*, anchored for the night, and buried our men who had been killed.

13. We remained in the vicinity the following day, and I sent the *Moth* back to Basra for repairs, and the prizes down river. The advance of our army continued, and we reached Aziziyah on 1st March. Here the Turks had abandoned more guns and again retreated. I was joined here by H. M. S. *Waterfly*.

The pursuit was continued on 5th March, and our cavalry again engaged the enemy rearguard near Lajj, but we were unable to distinguish anything owing to a dense sandstorm.

14. We arrived at Ctesiphon on the 6th, finding the strong position there deserted, and next day arrived in gun-range of the enemy position on the north bank of the Dialah River, which joins the Tigris on the left bank about 8 miles below Baghdad.

In attacking this position we again came under heavy fire from the Turkish guns, to which we briskly replied. During the night of the 10th-11th the enemy evacuated the position, as some of our troops had crossed the Dialah, and others were carrying out a wide flanking movement on the right bank to the southwest and west of Baghdad.

An attempt had also been made to send two motor lighters full of troops to land them on the left bank above the Dialah on the night of 10th March. One of them, however, grounded in the shallow river in gun-range of the enemy. I sent H. M. ships *Tarantula* and *Snakefly* to assist, and *Tarantula* rendered valuable assistance by extricating the motor lighter from her dangerous position before daylight.

15. The Baghdad railway was seized early on the 11th March.

I proceeded up river with the gunboat flotilla, which included H. M. S. *Firefly*, Lieut. Commander C. J. F. Eddis in command, during the day, with mine sweepers ahead, and arrived at the Citadel at Baghdad in H. M. S. *Mantis* at 3.40 p. m., on Sunday, 11th March, Paddle Steamer No. 53, having on board Sir F. S. Maude and staff, being in company with the flotilla.

The pursuit of the enemy was continued up river, and two iron barges captured.

16. I have much pleasure in bringing to your notice the excellent behavior and spirit of the captains, officers and men under my command during these operations, which were, in my opinion, worthy of the great traditions of His Majesty's service.

In conclusion, I desire to express how greatly the naval forces serving in Mesopotamia have always been indebted to the military and political services for never-failing help and assistance on all occasions.

I have the honor to be, sir, your obedient servant,

WILFRIED NUNN,
Captain and S. N. O., Mesopotamia.

—*Supplement London Gazette*, 21/9.

THE TIGRIS FLOTILLA OF GUNBOATS.—The Tigris flotilla of gunboats, referred to in Captain Nunn's report describing the share the navy took in the capture of Baghdad, consisted of a number of very shallow-draft vessels, termed the "Fly" class, so called because their names terminated with the word "fly"—such as *Firefly*, *Butterfly*, etc. These vessels were ordered from Messrs. Yarrow, in February, 1915, by Lord Fisher, then First Sea Lord; and, in order to avoid the "red tape" inevitable to government departments, Lord Fisher, with the concurrence of the Admiralty technical authorities, gave the Yarrow firm a free hand as regards their design and construction. Twelve gunboats were ordered in the first instance, and, after the capture of the *Firefly* by the Turks, the Admiralty

increased the number to 16. The object Lord Fisher had in view was that these vessels should police the Tigris, operating against the Arab tribes, who were constantly giving trouble by attacking passing steamers, by firing at them from the river banks. Although these vessels were not specially designed to meet artillery, Captain Nunn states they were of invaluable service in co-operating with the land forces when dealing with the Turkish Army.

The form of hull was carefully determined with the assistance of the authorities at the National Physical Laboratory, at Teddington, who have charge of the Experimental Tank, in order to secure the minimum resistance with the dimensions admissible. The Tigris, as is well known, is an exceptionally tortuous river, and, in places, exceedingly shallow, the sandbanks shifting from day to day. It was therefore desirable to adopt a type of vessel having the lightest possible draft, and as small as was consistent with other requirements, so that when a vessel ran aground the difficulty of hauling it off should be minimized. The length of 120 feet, and a beam of 20 feet, were determined upon, with a draft of 2 feet 6 inches. The draft, in fighting trim, was so small that when the river overflowed its banks it was possible to save a great deal of time by cutting

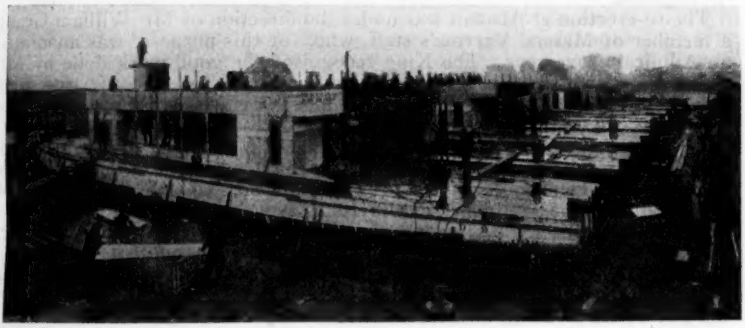


FIG. 1.—Vessels Being Dissembled at Messrs. Yarrow's Scotstoun Yard, Glasgow

off the bends; as a matter of fact, the Arab pilots often indicated the course over the shallows by walking in the water ahead of the vessel.

Having in view the urgent need for these vessels at the earliest possible date, the design, in a great measure, was determined by considerations of rapidity and simplicity of construction, and thus a single screw was adopted. The screw-in-tunnel, with Yarrow's patent hinged flap, was the mode of propulsion selected. This hinged flap, as is well known, secures the best result under all conditions of load, and prevents the tunnel being suddenly emptied when meeting the wash from passing steamers. It also gives better control when going astern, in which respect shallow-draft vessels, propelled either by stern-wheels or screws, are deficient. The success of this system of propulsion is now well established, as, for example, in the case of the *Shu-hun*, which vessel, since 1914, has regularly navigated the rapids of the Upper Yang-tsze-kiang, which were obstacles to steam vessels prior to the introduction of this system. The propelling machinery consisted of a set of triple-expansion engines, and one Yarrow boiler fired with oil fuel—or which there was ample available from the Anglo-Persian Oil Company's refinery, which obtains its supply through a pipe-line running into the interior of Persia. The boiler was fitted with fire-bars and arranged for burning coal, so as to provide for the contingency of the oil supply

being cut off by the Turkish troops. At first it was proposed to proportion the boilers for burning wood, but it was found that, since the days of the Garden of Eden, trees, with the exception of a few palms, had disappeared from the Tigris Valley!

All the hulls were temporarily erected in the Yarrow yard, for shipment in pieces, as is shown in Fig. 1, annexed. The machinery was fixed in position, and the pipes connected up on one of the vessels, which thus served as templates for the others. No difficulty was experienced in re-erecting and completing the vessels on the Tigris. Instruction to proceed with these gunboats was given on February 9, 1915, and the last of the 12 vessels was finished, ready for shipment to the Persian Gulf, on August 11 following. Operations on the Tigris were commenced on August 24, 1915, when the keel of the first vessel, the *Firefly*, was laid at Abadan. Abadan is 32 miles below Basra, and was selected for the re-erection of the vessels so as to secure the co-operation of the staff and appliances belonging to the Anglo-Persian Oil Company, who have large works on this part of the Tigris. The *Firefly* was commissioned on November 2 following, and was the only one of the "Fly" gunboats which took part in the first expedition under General Townshend—when she was captured by the Turks, and later on retaken during the operations which resulted in the capture of Baghdad.

The re-erection at Abadan was under the direction of Mr. William Grant, a member of Messrs. Yarrow's staff, who, for this purpose, was appointed an Admiralty overseer. The King recognised the good work done by Mr. Grant in putting the vessels together with such rapidity, by conferring upon him the Order of the British Empire during His Majesty's recent visit to Glasgow. As might be expected, there was great difficulty in finding suitable labor in such an out-of-the-way place. Men were drawn from all parts, Mr. Grant only being assisted by eight Europeans. At one time there were 900 men employed, and they consisted of all sorts and descriptions of races and religions—Indians of different castes, some of whom were excellent workmen; Arabs; Persians of all denominations; Chinese, etc. The difficulty of so many races working together on one contract can be easily imagined, especially when it is considered that each race had its particular feast days and fasts; and, of course, their religious observances did not admit of being interfered with. Many had prayers at all hours of the day, when they could not be disturbed. At the beginning of the work some 40 Turks were discovered helping to put the gunboats together. Needless to say, they were very soon cleared out. It appeared that, provided the pay was good, their patriotism did not prevent them from working on vessels intended to operate against their own people!

Three vessels were laid down near the river, parallel to the bank, and three more were erected behind them, arranged to be launched sideways. The three next the river were finished first; after they were launched, those immediately behind were slid down on the way to the positions vacated by the first three; then a third set of three was built behind; and so on until all were finished. The last of the 12 gunboats was commissioned on March 11, 1916. Although the Yarrow firm were given a free hand in carrying out this contract, they received the cordial co-operation of the technical authorities at Whitehall.

In addition to the 12 "Fly" gunboats, there were four larger gunboats which also formed part of the expedition to Baghdad, viz., the *Mantis*, *Moth*, *Tarantula* and *Gnat*. These belonged to another flotilla of 12 ordered by Lord Fisher from the Yarrow firm simultaneously with those of the "Fly" class. In this case the vessels were constructed by different firms, who worked from designs supplied by Messrs. Yarrow, thus ensuring uniformity throughout. They were 230 feet long by 36 feet beam, propelled by twin screws working in tunnels with Yarrow's hinged flap. They were riveted up in this country and navigated out to the Persian Gulf. Although designed for river navigation, and not intended to encounter

rough weather, the voyage in all cases was successfully accomplished by these vessels.

The Scotstoun, referred to in Captain Nunn's report, was a flat-bottomed stern-wheeler, fitted up as a repair shop, completely equipped with the necessary machines and tools, and was intended to follow in the rear of the flotilla so as to be available for the repairs found necessary from time to time. The vessels referred to in this article must not be confused with the many steamers placed on the Tigris at an early period of the war for transport purposes, these being obtained from various rivers in the East.

It must be very gratifying to Lord Fisher to see the success of the steps which he took to provide gunboats for the Tigris, and to obtain them quickly; and it proves the soundness of the policy adopted in entrusting a firm of repute with a free hand. The result of such a course appears to us, by the stroke of a pen, to have automatically increased the Admiralty staff at a time when they were overburdened with work; and we venture to think that this principle might be extended, under war conditions, to the benefit of the nation. The effect of its being known in a shipyard that the responsibility for an undertaking is left entirely in the hands of the firm, leads everyone, from the highest to the lowest, to strive their utmost in order to ensure success—a result which cannot be obtained if personal interest is not encouraged.

In allotting praise, which they so richly deserve, to those who took part in the naval expedition the authorities should not forget to show appreciation of the energy displayed by the workmen on the Clyde, who built this flotilla in six months and two days, for had they not put forth exceptional effort, the vessels could not have been finished in time to have taken part in the expedition, and in such case it is quite possible that Baghdad might not now be in our possession.—*Engineering.*

ITALY

SUBMARINE REACHES ARCHANGEL.—One of the longest submarine voyages on record has just been completed by an Italian submarine, which has gone from an Italian port in the Mediterranean to the Russian port of Archangel. Word reached Washington, October 19, that *Le Temps*, of Paris, has announced that the Russian Minister of the Navy had allowed the publication of news that this Italian submarine—a small one—had reached Archangel safely.

Why this craft was sent to the far northern port has not been disclosed. It is surmised in naval circles that the submarine is to be taken apart at Archangel and trans-shipped overland to the Baltic or the Black Sea to be reassembled for use against the German or Turkish navies.—*N. Y. Times*, 20/10.

SHIPPING BOARD ALLOTS TWENTY-FIVE SHIPS TO ITALY.—The government, through the United States Shipping Board, is to turn over 100,000 tons of shipping to Italy, to relieve its economic situation, which, through lack of ships, is reported serious. This will involve supplying about 25 steel ships.

To carry out the arrangement, the government will requisition, among others, some of the Great Lakes steamers. It is in position now to turn over half a dozen big ships, and the others will be supplied, it is expected, within a month.

Italy has borrowed ships from Great Britain, using some of them to transport wheat from India. Britain's own demands, owing to the U-boat activities, have become such that she has been obliged to recall some of the vessels loaned to her ally. This deficiency the United States will make up and, in addition, furnish more tonnage.

With the 100,000 of tonnage to be given by the United States, it is said, Italy will have ample shipping for all her requirements. The loan of ships will be made for the period of the war.

The government, only a few days ago, announced that it was to supply, at once, 20 ships to France. This involves about 100,000 of tonnage. Part of it has already been supplied.

The Shipping Board finds itself confronted with the necessity of working its shipbuilding yards in continuous shifts, three a day, if it is to turn out the tonnage required for the United States and its allies. Approximately 200,000 men are at work in the government and private shipyards, but this number, if the government is to build ships for the increasing demand, must be increased to 500,000 men. Scarcity of workmen threatens to handicap the program of the Shipping Board.

Chairman Hurley, of the Shipping Board, has conferred with administration heads, with a view to supplying the deficiency in workmen, and expects that the problem will be satisfactorily solved. If the Shipping Board's plan works out the shipyards will be able to turn out 5,000,000 of tonnage by the end of 1918. Of this aggregate, it is expected, 1,000,000 tons will be put on the ways by next March.

The problem of getting workmen for the yards is the only stumbling block in working out the government's gigantic scheme. It was pointed out to-day that skilled workers in shipbuilding are quickly developed from raw material and that the problem ought to be worked out without extreme difficulty.—*N. Y. Times,* 26/10.

COAL SITUATION.—The railway companies announce an increase in the number of fast freight and express trains throughout Italy, owing to the improved coal situation. It is now apparent that the enemy submarines have been unable to check the present arrival of new stocks of coal. Slow trains are burning wood or lignite, large quantities of which were collected during the summer.

Heat for the civil population is still a problem. Although there are large stocks of wood and charcoal in the hands of dealers, they refuse to sell it, even for cooking purposes, in the hope of receiving higher prices during the winter.—*N. Y. Times,* 20/10.

TREACHERY IN THE ITALIAN NAVY.—The following excerpt is from an article entitled *The Vatican and the Germanic Powers,* by Louise E. Matthaer, which appeared in the October number of *The Contemporary Review:*

"Within an interval of a few weeks two Italian cruisers, the *Benedetto Brin* and the *Lionardo da Vinci* exploded in the harbor of Brindisi under mysterious circumstances. The naval authorities had no trouble in convincing themselves that this double disaster was due to crime. The difficulty was to get on the track of the criminals. A substantial reward was promised to anyone who by useful information would assist in their discovery. The naval authorities had already remarked one singular coincidence. The engineers and stokers who had escaped in the catastrophe of the *Benedetto Brin,* owing to their having secured night leave, had also escaped, and for the same reason, in the catastrophe of the *Lionardo da Vinci.* Every movement of those sailors was subjected to close and patient supervision. The imprudence of two of them proved their undoing. Both were discovered just when they were calling in Rome on a journalist, Archita Valente. This man, who had been a failure both in the press and on the stage, had edited before Italy entered the war one of those bogus papers, *La Vittoria,* which grow like mushrooms in every large city. This suspicious sheet was subsidized by unknown patrons, and was managed by a certain Signor Ambrogetti, the confidential agent of Monsignor de Gerlach. The two personages were arrested at the same time as the two sailors who had gone to receive the payment of their treason. The police did not dare touch the Bavarian prelate, who, under the Italian Law of Guarantees, enjoyed diplomatic immunity. Before the criminal proceedings had been started, Monsignor de Gerlach and his chief accomplices were able to escape to Switzerland."

JAPAN

CARGO SHIPS PLACED AT ALLIED DISPOSAL.—Fifty cargo ships now building in Japan will be placed at Allied disposal for the munition trade. The United States is expected to release 150,000 tons of steel to complete these 50 ships of about 400,000 tons capacity.—*Shipping*, 20/10.

JAPAN NOT TO SEND TROOPS TO EUROPE.—Lieut. General Oshima, the Japanese Minister of War, informs Japanese newspaper men that the dispatch of troops to Europe is an absolute impossibility, owing to the tremendous cost and the lack of tonnage. Baron Takahashi, former Minister of Finance and one of the leaders of the Seiyukai party, in an article in the newspapers declares the Japanese Army is deficient in ordnance and airplane equipment.—*N. Y. Herald*, 15/11.

THE NETHERLANDS

MERCHANTMEN.—New proposals made by the war trade board for the release of the *Nieuw Amsterdam* and other Dutch ships now in American ports have been submitted to Holland by Chevalier van Rappard, the Netherlands Minister.

The Dutch Government is ready to make substantial concessions to prevent commandeering of the vessels by the United States. It was made clear that while the ships could not be devoted to traffic within the danger zone without the consent of Holland, they could be put to any other use in coastwise or overseas trade which would release Allied tonnage. Proposals for unlimited use of the ships have been turned down by the Dutch.

One hundred Dutch subjects stranded in New York have petitioned President Wilson to assist them to obtain passage to their own country.—*Washington Post*, 24/10.

NICARAGUA

CLAIMS ISLANDS OF SAN ANDRES AND PROVIDENCE.—It is reported in San Juan del Sur that Nicaragua has put in a claim to the Colombian islands of San Andres and Providence, lying off the Mosquito coast at about latitude 12 north and longitude 80 west.

It is pointed out that these islands would be useful in the protection of the Panama Canal, as Providence Island would make a good coaling station and San Andres provide a suitable wireless site.—*N. Y. Times*, 6/11.

RUSSIA

ADMIRAL VLADISLAVOFF MISSING.—Admiral Vladislavoff, who was in command of the submarine flotilla during the German operations against the Russian islands in the Baltic, has disappeared.

It is believed he fell overboard from a submarine.—*Washington Post*, 29/10.

NAVAL COMMISSION LOYAL.—Admiral Koltschek, formerly commander of the Russian Baltic fleet and head of a Russian naval commission that has been consulting in Washington with government officials, said, November 9, that he and his fellow commissioners would not support the Lenine government, but would report to the government represented by Kerensky on reaching Russia.

"I believe this is only another transitory event," the admiral said, referring to the Petrograd revolution, "and think all right-minded Russians soon will come to their senses."

He added that he felt convinced that the revolt was not the end of Kerensky's government.—*N. Y. Herald*, 10/11.

SPAIN

NEW CONSTRUCTION.—Three submarines, *A-1*, *A-2* and *A-3*, ordered by the Spanish Government from Italy recently entered Tarragona Harbor. Señor Dato states that six more submarines are being built, and within a short time the Spanish submarine fleet will comprise 10 units. Hitherto Spain had only one submarine, which was built in America.—*The Army and Navy Gazette*, 20/10.

SWEDEN

THE BATTLESHIP "SVERIGE."—The following are the main characteristics of the new Swedish battleship *Sverige*, which has recently been completed at the Gotaverken, Gothenburg: Displacement, 6800 tons; complement, 408; length, 392.75 feet; beam, 62 feet; draft, 20.5 feet. The armament, built by Bofors, consists of four 11-inch 45-caliber (A 5) guns; eight 6-inch 50-caliber; six 12-pounders; four machine guns and two submerged torpedo tubes. The protection consists of a belt, 8 inches amidships and 6 inches at the ends; deck armor, 1.75 inches thick; the redoubt has 4-inch armor, the big-gun turrets 8-inch, the smaller turrets 3-inch to 5-inch, and the conning-tower 8-inch armor. Two of the 11-inch guns fire ahead and two astern, and four of the 6-inch fire ahead and four astern. The ship is propelled by turbines built by Messrs. Bergsund and Co., supplied with steam from 12 Yarrow boilers. The turbines are designed to develop 20,000 horsepower and to give the ship a speed of 22.5 knots. Coal carried, nominal 350 tons, maximum 700 tons, and 1100 tons of oil. The ship was sanctioned in 1911, but upon a change of government was cancelled by the Liberals. The nation then voluntarily subscribed a sum which, at the end of April, 1912, amounted to nearly 970,000*l.* The ship is estimated to cost 670,000*l.*, and the balance is to go towards building another ship. The *Sverige* is fitted with Kermode's patent pressure-jet liquid-fuel system; highly satisfactory trial trips at sea have just been completed, and the vessel is now commissioned.—*Engineering*, 12/10.

BATTLESHIPS "DROTTNING VIKTORIA" AND THE "KONING GUSTAF V."—Swedish shipyards will be fully employed for several years with contracts for new vessels, the Lindholmen yard, for instance, till 1922. There is a marked shortage of skilled labor, and it is very difficult to procure the necessary raw material. England does not supply anything, and Germany demands 500 kroner to 600 kroner for steel plates which, on the German market, only cost 300 marks. The price which Swedish shipyards at the present time have to ask for new contracts is therefore between 1100 kroner and 1200 kroner per ton, a price which is bound to have a decidedly deterrent effect. German shipyards ask 600 kroner per ton, although they use Swedish ore. The manager of the Lindholmen yard, quoted by a Swedish newspaper, has not much faith in the building of "standard" vessels, as far as Swedish shipbuilding is concerned, as a means of increasing the output, because Swedish shipyards are arranged for the building of special types, and the introduction of a uniform type for the whole country would hardly lead to a satisfactory result. In spite of all the difficulties arising from the war, the building of the second and third ironclad of the *Sverige* type has been duly proceeded with; the *Drottning Viktoria* is soon to be launched from the Gotha shipyard in Gothenburg, and the *Koning Gustaf V* will be launched from the Kockum yard, Malmo.—*Shipping*, 27/10.

UNITED STATES

THE DESTROYER.—The announcement of the Navy Department that on October 16 an American destroyer was torpedoed in European waters by a submarine while on patrol duty but not sunk, with casualties of one killed and five wounded, calls attention vividly to the remarkable experi-

ence which has been furnished by the American destroyers engaged on patrol and other duty abroad. We have had vessels of various types in foreign waters for six months and there has been practically no trouble with any of them. They have stood up in their machinery in an admirable way; the repairs needed have been insignificant; they have been kept on their tasks without interruption worth mentioning in nearly every instance. The naval authorities realize that it is upon the destroyer that this country must largely depend for its activities at sea against the enemy and especially in the operations to offset the submarine. In the recent conferences held in the Navy Department on the return from his foreign trip of Admiral Mayo, there have been some interesting plans made for the extended employment of the destroyers, which class is coming along very satisfactorily in the matter of construction, so that there should be a considerable number of destroyers available for active duty by the time submarine activities are renewed next spring. It is appreciated in the Navy Department that the main reliance must be upon boats in possession of sufficient speed and armament to cope with the enemy submarines and that our destroyers will be competent in that important capacity provided we have enough of them. It is, therefore, essential that every means be taken to push to completion the destroyers that are under contract and there are indications that that is the program of the Navy Department. The experience of our naval officers abroad has been entirely in favor of the employment of the destroyer as the most available and effective weapon that can check the German submarine warfare. Of course, greater protection of transport and merchant vessels by armed guards and strong convoys is not to be minimized as a factor but the organized offensive, productive of tangible results, will be the destroyer.—*Army and Navy Register,* 20/10.

NEW CONSTRUCTION.—The Risdon Iron Works, taken over by the Union Iron Works, the Pacific subsidiary of the Bethlehem Shipbuilding Co., covers 80 acres of ground directly south of the Potrero plant of the Union Iron Works at San Francisco. The eight shipbuilding slips located on this property have not been in use since May, 1911, when the entire plant was secured as a supply and shipping depot for export trade by the United States Steel Products Co. The building ways will now be put into condition to build two destroyer ships each. This means that 16 destroyers will be building simultaneously at this plant. It will be recalled that the Union Iron Works has a contract to build 40 destroyers for the U. S. Navy. The New York Shipbuilding Corporation will build 20 destroyers at Camden, N. J., and the Newport News Co. and William Cramp and Sons Co. are also buying tools to equip the new extensions now being made to build destroyers. Ten structural mills have been awarded the contracts for the steel plates and shapes required for building the 150 destroyers; 19,500 tons of shapes have also been ordered, each destroyer requiring 130 tons.—*Shipping,* 3/11.

The Bethlehem Steel Corporation has received orders from the government for over 150 torpedo-boat destroyers, to cost around $1,500,000 each. This would make total value of the order approximately $225,000,000, and no doubt is the largest contract from the amount of money involved, awarded by the government since war was declared.—*Shipping,* 27/10.

THE FORE RIVER PLANT.—The new plant of the Fore River Shipbuilding Corporation located a few miles south of Boston, will, in the course of a few months, be the greatest destroyer plant in the world. It will be erected by the Aberthaw Construction Company, of Boston, at a cost of over $9,000,000 (£1,850,000).

This is by far the biggest thing of its kind ever attempted in the United States, particularly in view of the fact that the plant will be practically finished at the beginning of 1918. The complete development will comprise a large number of small destroyer slips and the necessary manufac-

turing buildings, the latter having an aggregate floor space of more than 2,000,000 square feet.

To gain some idea of this tremendous undertaking compare it with the contracts for building the great army cantonments, the largest of which was two million less than the job just awarded the Aberthaw Company. It should also be noted that the present development is a permanent proposition, the work being almost entirely reinforced concrete, whereas the cantonments were temporary structures built mostly of wood.

After the completion of the plant the program calls for delivery by the Fore River Corporation within two years of at least 46 destroyers. These will cost $1,500,000 (£308,000) each, or a total of $69,000,000 (£14,168,000).

In addition to the main plant outside of Boston, there will be erected a $2,500,000 turbine plant at Buffalo, N. Y., and another $1,500,000 plant in Providence, R. I. The equipment from these plants will be shipped to Fore River as soon as completed.

The construction of the plant itself will require more than 4000 men, and the Aberthaw Company plans on having this full quota on hand by November. For the construction of the ships themselves the Fore River Shipbuilding Corporation will need from 8000 to 10,000 men at Quincy, 3500 at Buffalo, and 1000 at Providence. They will endeavor to obtain part of the necessary quota by offering positions to Aberthaw men who are at present working on the construction of the plant.

Material for the ships will not be lacking, since the priority board has given the destroyer builders preference over all other concerns working for the government, even over shipbuilders constructing the merchant fleet. Furthermore, the Carnegie Steel Company has rolled steel for 32 destroyers in two months, and can, therefore, readily make delivery for the ships to be built under the new program.—*International Marine Engineering.*

TORPEDO CHASERS.—Two craft of this type have recently been delivered to an Atlantic naval torpedo station for use in chasing torpedoes and in registering the vital statistics pertaining to them.

These were designed and built by the Albany Boat Corporation, and are an example of their standardized 35-foot fast runabouts, many of which have been built during the last season. With a few minor changes these standardized boats were adapted to the requirements of the United States Navy and have given a very good account of themselves in actual service. In fact, the government officials have been very surprised that boats of this type could stand up against the work and do everything required of them so efficiently and so consistently.

These two 35-foot torpedo chasers are equipped with eight-cylinder 5½ x 6-inch Van Blerck engines, operating at 1600 revolutions per minute, turning a Columbian architect propeller, 21 x 30 inches, and giving a maintained sped of 35 miles an hour at the standardized government test.

One of the requirements of the government for these particular craft was that they be delivered on their own power from the factory, at Albany, N. Y., to the naval torpedo station. The initial run was from Albany to Poughkeepsie, 74 miles, in 1 hour 59 minutes; then the run was continued from Poughkeepsie to New York, and the total distance of 140 miles from Albany to New York was covered in 3 hours 45 minutes, actual running time, or an average of 37 miles an hour.—*N. Y. Herald,* 4/11.

DRY DOCKS IN CANAL ZONE.—Of the two big dry docks to be built at either end of the Panama Canal, the one at Balboa is to be the larger. This dock will be 1000 feet long, the entrance width will be 110 feet, and at mean low water the depth over the keel blocks will be 29.3 feet. The structure will be of concrete, and the entrance will be closed by miter gates. Here it will be possible to repair the largest vessels afloat, as the main repair shops in the Canal are also situated at Balboa. This dock is to be completed late in 1917. The dock that will be built at Cristobal, on the Atlantic side of the Canal, is to be begun very shortly, and will be 300 feet long.—*The Engineer,* 12/10.

MORE GERMAN VESSELS GET AMERICAN NAMES.—The following further changes of names are announced for German vessels taken over by the United States: *Governeur Jaeschke,* to *Watauga; Neptune,* to *Minnow; Pommern,* to *Rappahannock; Setos,* to *Itasca; Prinze Waldemar,* to *Wacouta; Holzatia,* to *Tippecanoe; Loongmoon,* to *Coosa; Staatsedretar Kraetke,* to *Tacony; Camilla Rickmers,* to *Casco; Elmshorn,* to *Ticonderago; Esslingen,* to *Nyanza; Johanne,* to *Iosco; Lyeemoon,* to *Quantico; Coblenz,* to *Sachem; Pington,* to *Quinnebauch; Sachsen,* to *Chattahoochee; Sambia,* to *Tunica; Suevia,* to *Wachusette; Tubingen,* to *Seneca; Elsass,* to *Apelles; Steinbeck,* to *Arapahoe,* and *Dalbek,* to *Monongahela.* These names have been approved by the government.—*The Marine Journal,* 27/10.

THE DAMAGE TO GERMAN SHIPS.—The announcement, passed by the censor, that the *Vaterland,* which was damaged by her German crew before being taken over by the United States Government, is now nearly ready to be put into commission, affords an opportune occasion for describing some of the details of the methods adopted by the enemy to make this consummation as difficult as possible. It is, of course, generally known that the officers of the larger liners saw to it that the most vital parts of the machinery and working arrangements were damaged as much as ever possible, but the amount of ingenuity applied to this end has been but dimly realized. On some vessels, for example, every bolt and nut had to be carefully examined, for it was found that many of the more vital ones had been sawn half through and replaced. The effects that would have resulted can be readily imagined, for in one case the small bolts holding together the lagging of the steam connections were treated in this manner. Supposing the steam chests had been put under pressure, it is conceivable that the bolts would have broken, after which a violent explosion would have taken place.

Quite a common practice seems to have been to place a steel wedge in the cylinder heads so as to break the piston rod and stuffing box upon the engine being cranked over. Again, a ring of holes was often drilled in the cylinder walls, the portion surrounded by the holes then being knocked out with a hammer. In these and other ways great care seems to have been taken to injure the cylinders as much as possible. The pumps were a very easy prey to the spoilers, and show signs of simply having been smashed with sledge hammers. Great care had to be exercised by the surveyors who examined the vessels in the first case, for death-traps lurked at every turn; the turning of a door handle, for instance, might have set an infernal machine working that would have wrecked the ship. On the other hand, many dummy bombs were laid about, apparently to add zest to the search. The most common place for live bombs to be hidden was among the coal bunkers, many of them having been cleverly disguised as lumps of coal.

A frequent occurrence was to find valves removed from valve boxes. The flanges on steam connections had also received careful attention, and holes were drilled in steam pipes, the holes being afterwards filled with dirt. In some cases the watertight floors of the double bottom had been riddled with holes. Sea valves, shell riveting, steering gear, compasses, watertight doors and manholes all gave evidence of diabolical cleverness, and great credit is due to the repairers in the United States who have worked so splendidly in order that the ships formerly owned by our enemies should be placed at the service of the Allied cause.—*The Shipbuilder,* October.

FILIPINOS DESIRE TO BUILD DESTROYER AND SUBMARINE.—The House has adopted a joint resolution authorizing the Governor General to offer to build for the United States at the expense of the Philippine government a destroyer and a submarine.

No appropriation is provided for in the resolution, but it would authorize the governor to spend the necessary amount. The measure now goes to the Senate.—*N. Y. Herald,* 12/10.

THE UNITED STATES NAVY AT WAR.—There is nothing in our vast national activities more inspiring than the way in which our navy has risen to the war call of President Wilson. Were it not that this world-conflict has taught us to think and speak in superlatives, a mere statistical statement of what the navy has done, is now doing, and proposes to do, would be cause for amazement and incredulity. As the result of close personal touch, for over twenty years, with the navy, we had reached a comfortable assurance that if, in some hour of stress, the nation should have to call upon this arm of the service for a supreme effort, it would rise to the call, seamen, officers and departmental administration alike, with a magnificent response.

Nor was there any reason to doubt that in the day of trial Congress and country would be found standing enthusiastically behind its navy. Of the popularity of the navy there was never any doubt; and although the question of naval appropriations has too often been made the sport of party politics, Republican as well as Democrat, we have never felt any doubt that, if politicians and people alike could once be awakened to the fact that only a strong navy could make permanently secure the peace of the country, and the great principles upon which our Republic is founded, the whole nation would rally to the support of the navy with gifts unlimited of men, money and materials.

Well, the call has come, and right royally has the response been made.

In their order of importance, the principal elements that go to make up a great navy, are: personnel, fighting ships and a full exchequer, and in each of these the development of the past twelve months has been phenomenal.

Personnel.—In a recent address of the Secretary of the Navy, at the graduation of ensigns in the Naval Reserve at Annapolis, Mr. Daniels stated that, whereas on September 1, 1916, the total enlisted strength of the navy and marine corps, including men and officers in the regular service and the reserve ranks, was 74,542, on September 1, 1917, the number was 232,930. Said he, "So popular has service in the navy become that the department has been compelled to limit enlistment, because it could not build training stations and provide ships enough for the thousands of splendid youths who have flocked to the navy."

Ships.—Commensurate with the great increase in the personnel has been the growth of material, both as regards the ships in commission and the laying down and rushing to completion of new units. To-day, practically the whole of the enlisted fleet is in full commission; and what this increase means may be judged from the fact that there are three times as many ships in active service to-day as there were six months ago. Moreover, as soon as President Wilson, realizing that the country was ripe for the movement, called for the enlargement of our navy until it should measure up to the vast duties imposed upon it, a program of new construction was adopted which was larger than any which had ever been laid down, even in the British Navy itself. The naval appropriation was at once increased from the average of former years of $145,000,000 to over $312,000,000. That is a huge sum; but it represents only a part of what Congress has done; for since the 1st of August, 1916, Congress has appropriated for the support and increase of the navy $1,344,184,896. Over and above that, the estimates pending before Congress carry an addition of nearly $600,000,000. The aggregate appropriation, therefore, in a little more than a year to make effective and impregnable the nation's first arm of defence is nearly two billion dollars. With such figures behind him, the Secretary was surely justified in saying to the Annapolis graduates: "If any man doubts that the American people are ready to wage this righteous war to victory, no matter what the cost, he need only consider the messages and acts of the President, and the legislation, and appropriation, revenue and bond bills that have passed Congress. They answer effectively and eloquently the suggestions of alien critics, that America is not enlisted with all its resources to free the world from the menace of Prussianism."

Great credit is due to the distinguished officers of the General Board of the Navy and the Naval Aid for Operations, who advise the administration as to policy, and to the Secretary himself, for the broad international spirit in which they have viewed the naval situation, and for the most loyal cooperation which they have shown in the plans and purposes of our allies.

As we mentioned in our last issue, the Secretary himself has borne eloquent tribute to the unselfishness and completeness of this cooperation. Its material result has already been witnessed in the gradual suppression of the U-boat campaign, of whose ultimate defeat it is a sure pledge. Had the United States Navy been less altruistic, we might now be bending our energies exclusively to the construction of that large fleet of battleships and battle-cruisers, which had already been authorized before we went into the war. But, being in the war, the navy has bent its whole energy to the construction of those units and the provision of that equipment which will be of most immediate service to the common cause. As witness the construction this year of over 300 submarine chasers of a new and more powerful type, designed especially for the work, and the appropriation even before these were finished, of the huge sum of $350,000,000 for the building of a fleet of destroyers, which will be larger and infinitely more powerful than that which we possessed when the war began.

Finally, a word as to the quality of these ships, and the officers and men who man and run them. No one can foretell the future; but we are disclosing no secret when we say that, if our battleship line should ever range up against the enemy, he will be treated at the longest ranges to a storm of fire, which, in rapidity, accuracy, and the uncanny way in which it clings to its ever-shifting objective, will be a most uncomfortable surprise to the enemy. For it is a fact that the methods of mounting, fire control, etc., which have been adopted and perfected in our navy, have raised our target practice to a point of accuracy, even at the longest ranges, which has never been reached in our own, or, probably, in any other navy.

As to the officers and men, we know from personal testimony and a close acquaintance with foreign technical literature, that the officers of our navy are held in the highest esteem, not only for their broad knowledge of the technique of their profession, but for the high character of their speculative contributions to naval technical literature. As to their seamanship and the quality of the crews, one has but to spend a few weeks on one of the ships of the fleet during its maneuvers, as was once the privilege of the editor of the *Scientific American*, to be satisfied that, when our ships cast loose for battle, they will be handled with a skill, daring and resourcefulness that will uphold the finest traditions of the service.—*Scientific American*, 27/10.

ORDNANCE AND GUNNERY

AIR TO PROPEL TRENCH-MORTAR MISSILES.—A goodly portion of the French trench mortars of to-day are of the compressed-air type. Instead of the usual powder charge, they make use of a puff of air or gas to propel the aerial torpedo or land mine through the air and into the German trenches.

After a lapse of some 30 years, the revival of the pneumatic cannon is apt to be hailed as a brand new idea. As a matter of fact, however, the idea is anything else but new. In several of his campaigns Napoleon encountered Austrian troops equipped with pneumatic rifles, and he is said to have seriously considered this type of weapon for his men. At various times during the nineteenth century, the idea of pneumatic cannon was suggested, and in several instances full-sized compressed-air artillery was actually constructed and tested. But with the introduction of modern explosives and propelling powders, the pneumatic cannon was laid aside as an impractical weapon. The present-day trench warfare caused the penumatic-cannon idea to be brought out into the open again, worked upon,

and then introduced in the form of a highly-perfected trench mortar which meets all the peculiar requirements of the intrenched warriors.

In the present pneumatic trench mortar the propelling charge is supplied either from a tank of compressed air or gas, such as carbon dioxide, or from a tank which is charged by means of a hand-pump. In either case the tank can be used for a number of rounds before it is recharged, since only a puff is necessary to eject the projectile. In the case of the hand-pump type, 200 or 250 strokes of the pump handle are sufficient to produce a pressure of 8 to 10 atmospheres in the reservoir, which, in turn, is sufficient for a number of rounds, The apparatus which releases the puff of air is operated by means of a trigger or lanyard, and immediately following the release of the propelling charge an automatic valve shuts off the further escape of air or gas from the tank. Indeed, it is the mechanism which only allows a sudden puff of air or gas to be injected into the chamber of the cannon, behind the projectile, which presented the greatest problem in the development of this type of artillery.

TESTING A PNEUMATIC TRENCH MORTAR OF THE TYPE USED BY THE FRENCH ARMY AT PRESENT

It is reported that, aside from being silent and inexpensive of operation, the pneumatic mortar lends itself to ready manipulation. It can be handled at a fairly high rate of speed. Most important of all, however, is the fact that the aim of the pneumatic trench mortar is exceedingly accurate, provided the reservoir is not discharged below a certain point. Obviously, it is the short range over which the trench mortar must be operated, namely, 750 to 1000 feet, which has made this form of pneumatic artillery a military success.—*Scientific American*, 3/11.

NAVY SHELLS.—The chief of ordnance of the navy is in receipt of bids this week for 5-inch projectiles of a quantity estimated to cost $4,000,000. Bids were asked for varying amounts from 250,000 to 336,000. Only two bids were received, which is a less number of proposals than was expected or than has hitherto been forthcoming when a contract of this character was to be awarded by the naval authorities. This is taken as an indication

of the increasing amount of work which is being performed at munition plants all over the country in the production of supplies for the war. The bids received by the ordnance bureau were from the Ingersoll-Rand Company, $11.24 each, and the Bethlehem Steel Company, $12.90 each. The former firm presented an alternate bid based on the condition that the government furnish the steel. The deliveries promised by the Ingersoll firm were to begin the 1st of May at the rate of 1000 projectiles a day. The Bethlehem Company would deliver 5000 in May with an increase of 1000 projectiles a month until September, when the deliveries would be at the rate of 10,000 a month.—*Army and Navy Register*, 11/10.

SMOKELESS POWDER FOR THE NAVY.—Contracts have been awarded at the Navy Department as follows:

18,000,000 pounds smokeless powder at 52 cents per pound, and 164,000 boxes for packing the powder at $5.6753 each, awarded to Hercules Powder Co., Wilmington, Del.

8,000,000 pounds smokeless powder at 52.5 cents per pound, and 57,143 boxes for packing the powder at $4.50 each, awarded to E. I. du Pont de Nemours and Co., Wilmington, Del.—*Army and Navy Register*, 27/10.

NAVIGATION AND RADIO

The Navy Department has recently purchased from the Sperry Gyroscope Co., Brooklyn, N. Y., 27 gyro-compass outfits complete for submarines and three gyroscope outfits without spare parts. The total contract amounted to approximately $300,480.—*Shipping*, 3/11.

A GERMAN DEVICE FOR SEEING WIRELESS SIGNALS.—One of the difficulties of receiving wireless messages on a flying aeroplane is the interference of the noise from engine or machine gun. It is, therefore, interesting to know that the Germans have devised a visual method of receiving wireless signals. With this device, we are told by William Dubelier, a radio-engineer of New York City, who is quoted in *The Electrical Experimenter* (New York, November), the reception of messages is made much more positive. Mr. Dubelier personally saw this apparatus in the Berliner factory at Vienna, Austria, and had the pleasure of observing signals received from a distant station. Says the magazine named above:

"This apparatus consists of a sensitive Einthoven galvanometer with a small electric lamp shown at the very bottom of the photograph. The light from this lamp is focused through lenses on to a small mirror, which in turn reflects the light through a magnifying glass, the same as in an opera-glass. The upper part through which the observer looks is constructed on the prismatic binocular principle, making the sighting apparatus equivalent to six times its length.

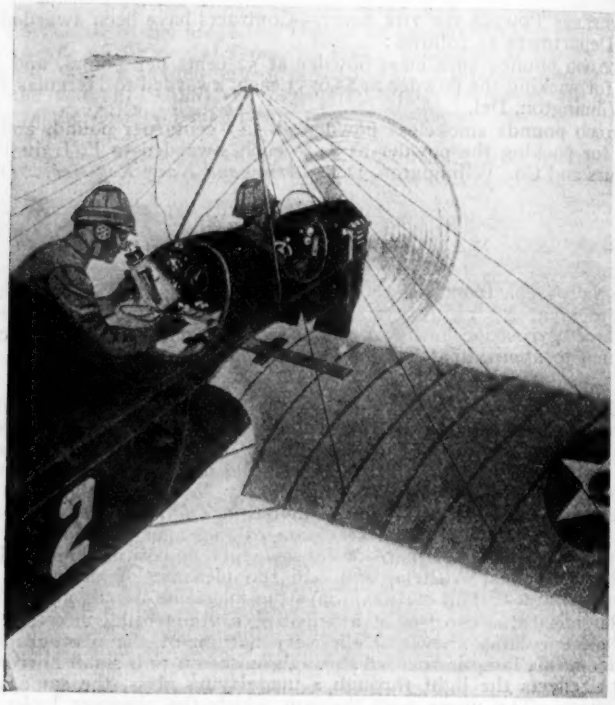
"In other words, the observer does not actually see the wireless signal or wave, literally speaking; he only sees the effect of the etheric wave, after it has impinged on the antenna attached to the aeroplane, and after it has passed through the tiny quartz fiber suspended between the poles of a strong magnet, and perpendicularly to the magnetic flux lines. If a weak current, such as a received radio-signal current, passes through this quartz fiber, the latter will be displaced from its normal position in a direction perpendicular to its axis and to the magnetic flux lines.

"The fine galvanometer string moves in front of a narrow slot, illuminated by the small lamp fed from a battery (see illustration). An optical reproduction of the slit and wire is thrown on the sensitive retina and pupil of the eyes, one of the most sensitive devices we know of. As the messages come in, in the the form of telegraphic dots and dashes—short

and long signals—the quartz string is deflected back and forth correspondingly; thus the radio operator 'sees' the incoming signals. A short deflection indicates a 'dot,' while a longer deflection represents a 'dash.'

"The apparatus just described and here pictured serves the same function as the detector used in all radio receiving sets. It is usual, therefore, to connect it with some form of tuning coil or transformer, so that the outfit can be readily tuned to the proper wave-length.

"As the illustration shows, the operator holds the instrument with both hands, or only one hand, if he desires to write down the message received.



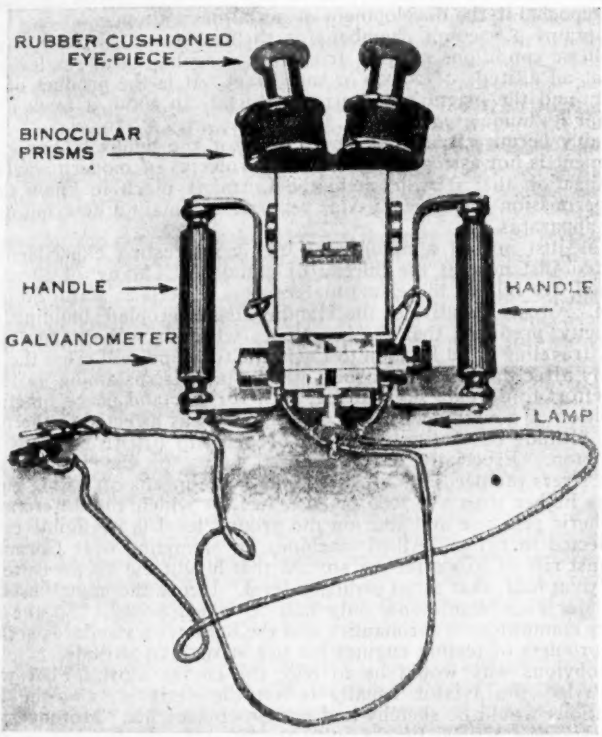
A FLYING OBSERVER "SEES" A WIRELESS MESSAGE

Illustrations by courtesy of "The Electrical Experimenter," New York.

This he can readily do with a little practice, keeping one eye on the instrument and the other on the message pad as he writes. A good operator can write down a message without looking at his pen or pencil. Besides, it is not impractical to install a light-weight typewriter on the aeroplane; and 'touch typists' never have to look at the keyboard. Radio and wire telegraphists are daily using the typewriter in just this way, by the thousand.

"The principle of the optical and photographic reception of radio signals is not new. The efficacy of the Einthoven string galvanometer in this rôle was quite thoroughly tested out by the Poulsen radio experts, both in this country and abroad. The American Poulsen interests—the Federal Telegraph Company, of San Francisco—spent many thousands of dollars in

their researches on this method of receiving radio signals, the only difference being that the movements of the quartz string were highly magnified and recorded photographically on a moving film. It is hopeful that this work may be taken up again and followed up to a successful conclusion. The United States needs the best it can get for every branch of its military service, and it would seem that the apparatus here described and being successfully manufactured in Germany can certainly be duplicated, and



HOW WIRELESS MESSAGES ARE NOT HEARD, BUT SEEN

The apparatus which enables the aviator to use the wireless to the fullest advantage

no doubt considerably improved, in this nation of vast industrial and scientific researches."—*Literary Digest*, 3/11.

RADIO ON AEROPLANES.—Notes from a lecture by Dr. Ames, of Johns Hopkins University, November 9, 1917:

Fire control aeroplanes work in squadrons, sending radio messages back to the gun. All the individual planes of a squadron send with the same wave length, but the character of the wave of each sender is given an individuality by means of a toothed wheel interrupter. The wing surface of the aeroplane furnishes the upper half of the antenna, a trailing wire 50 to 100 feet long, the lower half of the antenna, the spark gap, and inductance coil being connected between the two halves of the antenna.

Aeroplanes send and receive for distances running from 16 to 94 miles. The electric dynamo supplying the power for the radio signals is driven by a small wind propeller.—*Illustrated London News*, 13/10.

ENGINEERING

VACUUM CHAMBER FOR TESTING AIRPLANE ENGINES.—In the shadow of a little knoll out at the bureau of standards is a modest stucco building which may be epochal in the development of aerial navigation.

It contains a vacuum chamber for the testing of airplane engines at atmospheric conditions ranging from that encountered at sea level to that found at an altitude of 20,000 or more feet. It is the product of months of study and the ingenuity of many experts. In about a week it will be ready for its unique work.

Probably because it is considered well for the public to know that its government is not asleep in meeting the problems of modern warfare, and the realization that it won't help the Germans much to know the same thing, permission was given a *Star* reporter to obtain a descripiton of this unique apparatus.

This is just one of a number of highly interesting experiments being conducted just now at the bureau of standards. Many of them, it was explained, are related to peace-time progress as well as war. So it is with this one. A representative of the Handley-Page aeroplane building, recently in this city, predicted that the big planes which have been circling about Ostend, traveling from London to Paris and to Rome, will cross the Atlantic regularly after the war. And the United States is sustaining its full share of the effort to develop sky touring, both for war and peace functions.

Attention of government aerial experts first was directed to the problems of high altitude navigation when the French and British missions came to Washington. Especially did the aerial quota of the French scientific mission stress the necessity of developing some means of testing engines at altitudes higher than the 7000 or 8000 feet, at which the difference in the atmospheric pressure and that on the ground level is negligible enough to be neglected in flying. Allied machines, in skimming over German territory, must rise to 20,000 feet or so. At that height the air pressure is half, or less than half, that at an ordinary level. Hence the engine used generates, under such conditions, only half as much power. So the national advisory committee on aeronautics and the bureau of standards set to work on the problem of testing engines for use at such an altitude.

The obvious way would be to take the engine aloft. That would be risky. Also, the aviator usually is not the designer, and the former's observations would be sketchy and perhaps inaccurate. Moreover, even if an expert were aboard time would not be sufficient to observe fully the air, fuel, oil, water circulation, power production and the numerous other points involved. Another way would be to take the engine to the top of a 20,000-foot mountain—and mountains have been so utilized abroad—but the United States has no mountains to fit the experiment. The third alternative was to stimulate as nearly as possible, on earth, conditions of a 20,000-foot altitude, so the bureau experts set about bringing the mythical mountain to the mechanical Mahomet.

To do that a test chamber was devised which will exactly duplicate conditions at which an engine works when 20,000 feet above the earth. The engine can be started at sea level and "fly" as long and as high as need be for the observation, and "land" as fast or as slowly as the operator desires.

Planning such a test chamber is complicated business. It is more than arranging for a hermetically sealed room from which enough air may be drawn to lower the pressure to the desired point. To begin with, the chamber, as now built, can sustain an external pressure of nearly a ton to the square foot. It is 6 by 6½ by 15 feet, with walls 12 inches thick, made of concrete reinforced with steel.

Inside not only was reduction of pressure arranged for, but provision was made to care for the exhaust of the engine. If this were not done the engine intake would account for all the air in the chamber in about a minute. Provision also was made for the heat produced by the engine which, in the open upper sky, would be dissipated. A mounting similar to that of an aeroplane was arranged. To further duplicate conditions of actual flight the air left in the chamber must be in rapid motion.

One end of the chamber has big refrigeration coils, filled with ammonia, and five big fans provide the circulation. Openings in the side were necessary for passage through them of water, ammonia, thermometer, pressure gauges and other devices. A shaft runs through a stuffing box to the outside to connect with an electric dynamometer, to absorb the power up to 450 horsepower. Thus the power generated which, in flight, would propel the machine, will be turned to some other use in the test "flights."

The compartment is lined with cork to keep it from losing heat. The air that supplies the chamber must be brought in at a temperature to correspond with the zero Fahrenheit, which aviators find 20,000 feet above the ground.

Surrounding the chamber is the stucco structure, 24 by 50 feet, containing the ammonia refrigerating plant, an exhaust blower with a capacity of 1500 cubic feet a minute, weighing devices, measuring arrangements for estimating water and heat, including the heat which escapes in the water, the heat which escapes in exhaust gases and also the heat that leaves the engine in the circulating air around it; and, furthermore, for gauging the temperature of air and water, for indicating the pressure of the air in the vacuum chamber, the amount of air used to supply the engine, the power and speed generated and various other factors which enter into the tests.

The building and chamber, begun about July 15, now are practically completed. Doors leading into the chamber weigh 500 pounds apiece, and they are made so the covering will fall off in case of an explosion, so that the chamber will not be wrecked.

For observing the test port holes are provided, and covered with glass an inch thick. Aside from possibility of an explosion the danger of being inside would be the dislike of the human anatomy for any sudden change in air pressure. But despite this risk, the expert in charge coolly remarked: "I guess some of us will venture going in after the tests are started."—*Washington Star*, 28/9.

GIANT CRANE FOR UNITED STATES NAVY YARD.—The largest floating crane ever constructed in the United States has recently been designed and built by the Wellman-Seaver-Morgan Company, Cleveland, Ohio, for the United States Navy. It is now being used by the Navy Department at the Norfolk Navy Yard.

This crane is mounted on a pontoon 140 feet long, 85 feet wide and 15 feet deep. It has a lifting capacity of over 200 tons. The test load required by the navy for this machine, which it has already successfully handled, was 403,200 pounds, at a reach of 62 feet 6 inches over the side of the boat, or at a radius of 105 feet.

The builders of this crane have in the past few years successfully entered a field formerly monopolized by two or three European firms. This firm has also built three other large floating cranes for the navy, but none as large as this. The previously built cranes have been of the bridge type, in which the whole crane with its pontoon are turned and maneuvered to bring the hoisting cables to the proper positions for lifting loads.

The machine just completed, however, resembles somewhat in principle the ordinary revolving derrick, in which the jib is rotated until it comes opposite the work to be lifted and is then lowered until the hooks hang above the object to be lifted. The hooks are then lowered or raised by means of steel cables passing over sheaves built into the end of the jib.

To give a more concrete idea of the size and capacity of this apparatus, it may be said that its full-load capacity is equivalent to the weight of 100 of the largest touring cars. The crane would readily lift an ordinary shifting locomotive. The main hoist consists of two hooks, weighing 75 tons each, fixed on the jib. When raised to its maximum height the top

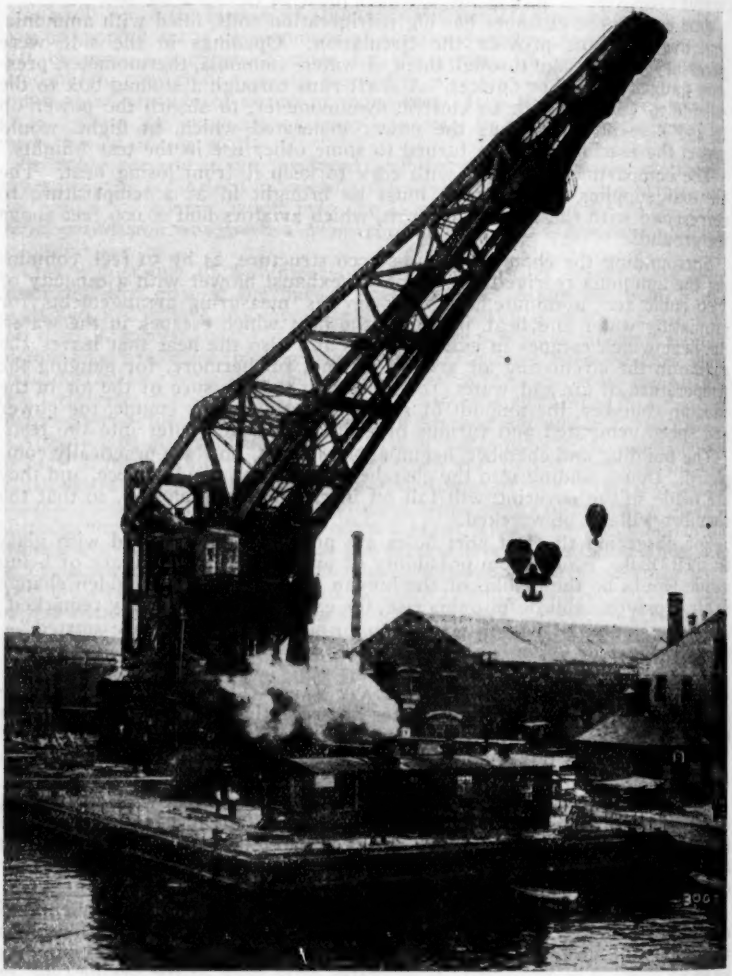


FIG. 1.—Crane Completed and Ready for Test at Norfolk Navy Yard

of the jib is over 200 feet above the water level; a height greater than that of an 18-story building. It must also be remembered that the whole structure is mounted on a floating pontoon, the stability of which must not be endangered by handling these immense loads. The total displacement of the pontoon crane is 5,000,000 pounds.

The pontoon itself contains a complete boiler plant and 150 kilowatt, engine-driven generator, which supplies the electric current for operating the various motions of the crane, which are controlled from a small house mounted high above the deck. One operator, by means of a few levers and master controllers (similar to those used in a passenger elevator), is able to control all the functions with the utmost delicacy.

The electrical mechanism is such that when the heavy loads are lowered the motors are turned into generators in such a way that the speed can be

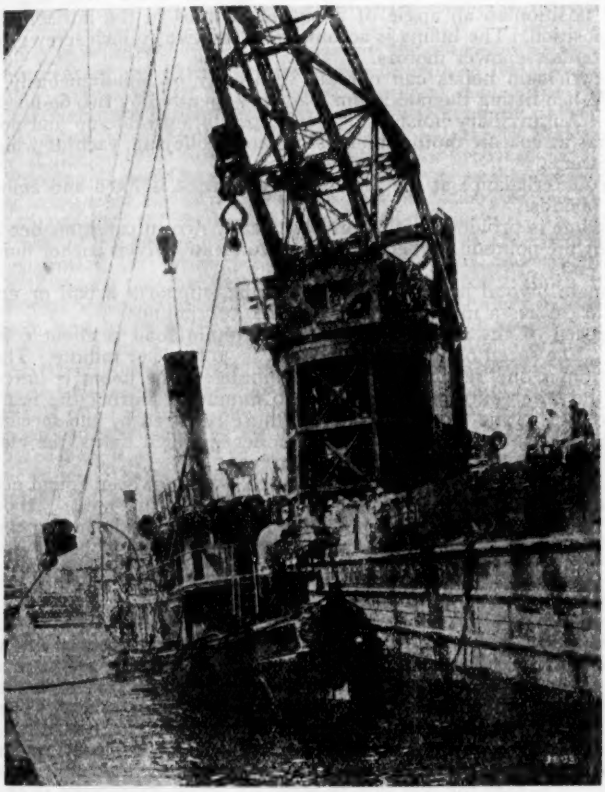


FIG. 2.—Floating Crane Hoisting Sunken Tug

controlled with great nicety. In case of an accidental interruption of electric current, all motions of the crane are automatically locked by means of magnetic brakes, so that it is impossible to drop the load from such a cause. Great safety and accuracy of control are essential, as the crane is used to handle large guns and turrets on battleships. These must not be damaged, their value being hundreds of thousands of dollars.

Fig. 2 shows the first work which this crane was called upon to do. The navy tug *Massasoit* was suddenly sunk in one of the harbors. After divers had passed cables under the tug they were attached to the crane and the tug was readily and quickly lifted to the surface, as shown.

It will be recalled that the Panama Canal Commission purchased two large cranes of this type for heavy lifting work at Panama. These cranes were bought from a large German corporation. When the test load was applied (which was the same as was applied to the machine shown in the illustration) the first of these German-built cranes collapsed and was wrecked, owing to the faulty design of the structure. In comparison, no weaknesses whatever have developed in any of the floating cranes built by the Cleveland concern.

The crane rotates in a complete circle, the rotating being controlled by two 60-horsepower motors. The boom luffs up and down from a practically vertical position to an angle of about 30 degrees in the horizontal, in its lowest position. The luffing is accomplished by two 10-inch screws operated by two 60-horsepower motors.

The two main hoists can operate separately or simultaneously, as desired. When lifting the maximum load it is operated by two 60-horsepower motors. An auxiliary hoist of 25 tons capacity, movable up and down the boom, has a separate motor for hoisting and trolleying, each of which is 60 horsepower.

The counterbalance at the aft end of the crane is fixed and amounts to 600,000 pounds.

The crane is provided with four electrically-driven capstans, one at each corner of the pontoon. There are also two steam-driven anchor hoists, one at each end.

The main pivotal bearing, or step bearing, supports a ball or universal joint and carries a maximum load of 2,021,000 pounds.

The speed of the main hoist under maximum load is about 6 feet per minute. The speed of the auxiliary hoist is 30 feet per minute. The speed of rotation is one revolution in four minutes. The boom is luffed from one to the other extreme position in 12 minutes. During the test all the speeds of this crane were in excess of those required by the specifications. The side lists and end lists were both under specified limits, the maximum side lists having been specified at 6 degrees.

The design was carefully worked out and it has not been found necessary to make any changes in a second machine now being built. About 5000 tons of steel were required to build the superstructure including the crane and its tower.—*International Marine Engineering*, November.

MERCHANT MARINE

SHIPPING AND SHIPBUILDING IN THE UNITED STATES.—The ambitious plans of our American Allies to build up a great merchant fleet are of more than ordinary interest. It is not merely that America intends to make every possible effort to counteract Germany's submarine policy. The great revival in the twin trades of shipping and shipbuilding in the United States, though it is, of course, being accelerated by the war, is by no means a creation of it. It is the outcome of a long agitation in America for more ships, begun before the war was thought of. This movement is of special interest to us, also, apart from the war, for it may be that when peace returns the United States will be our chief rivals in shipping and shipbuilding, as they were in the first half of the nineteenth century. It is probable, indeed, that America will seize Germany's position and will become the second shipping nation. If she does, we may be certain we shall not experience from her that insidious form of subsidized undercutting of rates by syndicates and the state that characterized German competition. America will meet us with fair, honest trading. Her shipping may be subsidized by the government in accordance with the principles of American law, which are that American industries shall be so protected, or so fostered, that they are able to compete with foreign trades that enjoy cheaper labor. The future of our shipping, which almost means the future of the British Empire, depends upon the measures our rivals take to revive

their shipping on the one hand, and upon our own efforts to meet the competition on the other. Because we own nearly as much shipping as all other countries put together we must not assume that our supremacy is unchallengeable. Our politicians must not imagine that they can heavily tax and harass this industry, and at the same time neglect to protect it against unfair competition, such as that of Germany, without detriment to our national interest. And our trade unionists must not forget that there are limits beyond which it is fatal to force up wages or restrict output. Our natural advantages are such that we ought easily to retain supremacy in shipping and shipbuilding. Our economic needs and imperial responsibilities are such that we must, at all costs, maintain our supremacy in this particular line.

According to an official statement outlining the shipbuilding program of the government of the United States, America will, in little more than a year, have a merchant fleet of more than 1600 ships, aggregating 9,200,000 tons. That would be nearly 10 times the pre-war tonnage of the United States. We beg leave to doubt the possibility of such a tonnage being attained—skilled labor is too scarce. In a statement prepared for Congress by the Shipping Board it appears that 433 ships of nearly 2,000,000 tons have been contracted for at an estimated cost of £57,000,000; 452 ships of nearly 3,000,000 tons are ready to be contracted for when funds are available at a cost of £91,000,000; 237 ships of 1,281,000 tons are under negotiation, representing an estimated cost of £38,800,000; 150 miscellaneous vessels of 1,800,000 tons account for another £60,000,000; whilst organization and other expenses are put at £7,000,000. The amount authorized by Congress in June last was £110,000,000; the amount to be authorized for the building program immediately in sight, making no allowance for changes in cost of labor and materials, is £143,900,000. Besides this the amount required for ships requisitioned, or "commandeered," is put at £103,000,000, and the cost of vessels to be purchased other than those under construction or commandeered is £50,000,000. It is said that a large part of the proposed fleet is expected to be completed by June, 1918. Against this optimistic statement the *Commercial and Financial Chronicle*, of New York, declares that the present rate of output of United States shipbuilding is little more than 1,500,000 tons a year, and is not expected to exceed a rate of 2,000,000 tons a year in January, 1918. The Shipping Board, above mentioned, was formed and has been empowered to take full control of American shipping under the terms of what is called the Ship Purchase Bill passed last session. This famous measure followed the Ship Registry Act of 1914, which authorized, on certain conditions, the transference of foreign-built vessels to the United States flag. When war broke out United States ocean-going tonnage only aggregated, in round figures, 1,000,000 tons, against Great Britain's 15,000,000 tons, and Germany's 5,000,000 tons. Since then nearly 2,000,0000 tons have been added by purchase from other countries, and about another 1,000,000 has been launched. The completion of the present program of the Shipping Board, if effected, will bring United States tonnage up to at least a round 10,000,000 tons. This, of course, is in addition to some 5,000,000 tons engaged in the lake, river and coastal trades of America. By the way, the 1916 session of Congress authorized the construction of 10 first-class battleships, 6 battle-cruisers, 10 scout cruisers, 50 torpedo-boat destroyers, 9 fleet submarines and 58 coast submarines. This program is being carried out in the naval yards, upon which six million dollars have lately been spent in improvements. It may also be mentioned that during the last two years £40,000,000 of new private capital have been invested in American shipping and shipbuilding enterprises. All these facts are evidence of the confidence which is felt in the future of American shipping and shipbuilding. Before the war the Americans could not approach us in these trades, measured by competitive costs. But it is thought, at least, in some quarters, that the war and its effects will so modify, or change, international conditions, that America will at last be able to compete with Britain and Germany even in shipping

and shipbuilding. In a notable review of the possibilities a few months ago the *New York Annalist* observed that "It was probable that for many years to come the cost of labor and materials in the United Kingdom and Germany would be as high as in the United States, and that the start which American yards had obtained, thanks to the war, would enable them to compete successfully with foreign shipbuilders." Other authorities, whilst not quite so confident, believe that the United States Government will so liberally subsidize, or in other ways foster, shipping that even this trade will again become prosperous, as it was prior to 1860, or 1862, when the state favors under which American shipping had rapidly advanced were withdrawn.

But what will happen in the future when nations resume the commercial methods of peace time? In our opinion the Americans, with their extremely high wages, with iron ore deposited a thousand miles from their coal, and with their iron and steel works mostly about 500 miles from seaboard, will never be able successfully to challenge our supremacy in shipping and shipbuilding, though they may prove formidable rivals. It will all depend upon two main factors: the extent to which the United States Government will go in subsidizing, or in other ways favoring, shipping; and the general policy adopted by our own trade unionists and politicians. If our shipping and shipbuilding trades are too heavily taxed, or otherwise unfairly treated by Parliament, and if our workmen are too exacting, whilst at the same time our rivals enterprise is lavishly subsidized by governments, then we shall find it more than difficult to retain our supremacy.—*The Engineer*, 12/10.

SHIPS VITAL NECESSITY.—Lord Northcliffe, head of England's special mission to the country, was the guest of honor at a banquet of the Chicago Association of Commerce, October 24. At its close the distinguished Briton received a welcome lasting several minutes when he arose to speak.

"I am one of those who say quite plainly, and believe absolutely, that we are only at the very beginning of this strange and mysterious thing that is passing over the world," he said. "Every person who thinks the war is approaching its close very naturally diminishes his or her error in the prosecution of the war. This is a war of the many behind the army. In the old days a war was chiefly fought by soldiers. To-day it is achieved by loan subscribers, mechanics, controllers of great munitions plants, farm producers, and in my own country very largely by women who have taken up man's work.

"Sometimes friends here tell me they think the people are not yet sufficiently earnest about the war. But I have found tremendous enthusiasm in the United States for the war and a gradual understanding of the fact that it is in essence a world revolution. In your American cities, you have a capacity for getting together, for combination, that we have not yet learned. I have found no lack of enthusiasm anywhere I have been in this country. Here to-day, in a city, I am told, which has a German population equal to Dusseldorf, I have witnessed an enthusiasm that is inspiring.

"Now, let us be frank. We have been told that you must put 6,000,000 tons of ships in the water in 1918. I see no signs of such a tonnage in 1918. I do see signs of filling 16 great cantonments; of the manufacture of immense amounts of munitions; but I do not see the signs of that bridge across the Atlantic without which all this recruiting, all this enthusiasm, all this manufacturing will be null and void.

"Therefore, I urge you, entreat you, to believe that your army without transports will be valueless. You have the power to build these ships. You are easily the most adaptable mechanical nation in the world. If you set your mind to build these ships you can do it as easily as you succeeded in a more difficult task—inducing 100,000,000 people to consent to military conscription. What was our great difficulty you accomplished almost in a night. To me the thing seemed like a miracle.

"It is no doubt because of their knowledge of the fact that shipbuilding is not making the progress here that it should, that the German affect to believe that you will not be able to enter the war in sufficient time to be of value in the war. In this matter of shipping you strike at a vital point in the waging of this war. If you cannot get the supplies to the men it seems to me almost idle to add to your already vast army.

"Get together on this as you have on other things pertaining to the war and you will make yours the army that restores peace to the world—not an early peace—but the peace to which we are all looking forward so eagerly.

"Now as to the extraordinary fact that food bought in the United States and shipped to Great Britain is sold there cheaper than in this country. It seems a paradox that flour should be cheaper in London than in Minneapolis, but the explanation is a most simple one. Our government is taking money out of the pockets of the rich to put cheap flour into the mouths of the poor. Our white flour is subsidized to the extent of $200,000,000 a year. It is therefore sold under cost. That is why our people are getting American flour cheaper than your people.

"In respect to other articles of food consumption you must remember that we have a very strict control. The people of Great Britain have seized the mills and have taken control of the wholesale and retail stores. They have enforced very strict laws against profiteering. These are some of the reasons why food in Great Britain has not reached the famine prices it might have been expected to reach.

"We ask you to conserve your food—not for our civilian population at all. That population can take care of itself. We have the great fear that there may be a shortage of food for the boys who are going through the hell of fire in the trenches. We ask you to join us in food production and in food conservation. It is necessary that you as well as we see to it that those who are bearing the greatest sacrifice of all shall not suffer in order that we may have our fill."—*Washington Post*, 26/10.

BUSINESS MEN UNITE TO PUSH SHIPBUILDING.—The Chamber of Commerce of the United States authorized the statement November 7 that in their determination to turn out approximately 1,000,000 tons of ships between now and March 1, the Shipping Board and the Emergency Fleet Corporation would have the backing of the commercial leaders and business men in an elaborate plan of cooperation which would reach to every part of the country. As a result of this effort 35,000 shipworkers are wearing badges bearing the inscription, "War Service shipbuilding, U. S. A.," and by means of posters and other methods of direct appeal enthusiasm for building ships is being stimulated.

Through the Chamber of Commerce every phase of the big problem has been gone into with the result that a plea to shipworkers is now going forth through local chambers of commerce, trade bodies and organized meetings of citizens.

Through the National Chamber War Shipping Committee, of which Edward A. Filene, of Boston, is chairman and N. Sumner Myrick, a well-known marine expert, vice-chairman, local committees have been formed by the Wilmington Chamber of Commerce, Newport News Chamber of Commerce, Chicago Association of Commerce, Tampa Board of Trade, Houston Chamber of Commerce, New Orleans Association of Commerce, New Orleans Board of Trade, Baltimore Merchants' and Manufacturers' Association, New York Merchants' Association, Newark Board of Trade, Seattle Chamber of Commerce and Commercial Club, Boston Chamber of Commerce, Philadelphia Chamber of Commerce Charleston Chamber of Commerce, Savannah Chamber of Commerce, and the Augusta Builders' Exchange.

These local committees are planning to hold meetings with the shipbuilders and have some member of the Shipping Board or other marine authority address the gathering and thus bring the builders into closer

relation. Many of these committees have formed sub-committees on labor, housing and transportation—these measures, by the way, being an important phase of the general problem.

The national committee, through its local committees, by way of cooperating with the federal authorities, is making a survey of the labor resources in each district in an effort to secure the consent of employers to release, when needed, men formerly engaged in shipbuilding work. There is no intention on the part of the committee to get labor away from one section to another. The object is to organize the resources in interior cities and towns so these places can be called upon to furnish men for shipyards when the need arises. In many interior centers there are those who have previously worked on ships. The committee, through local organizations, seeks to reach such men. Volunteers who fill out a blank expressing their willingness to go to the coast and work in shipyards receive a shipworker's reserve button.

The badges are worn by workers in shipyards as an emblem of the patriotic service they are rendering the country in time of war. They can be worn only by those actually working on ships.

At the suggestion of shipbuilders, who felt they ought to have something in the yards to urge the men to do their utmost in the work, a new poster has just been issued and is now being posted in the various shipping centers. It reads:

"To shipbuilders—For the support of our soldiers in France the government must have at once the ships you are building. Without these ships the war cannot be won. Our country looks to you. Every stroke of a hammer, every turn of a wheel may score as heavily as a shot fired from the trenches. Help our boys in France. With them win the war. Make the world safe for democracy."—*N. Y. Times,* 8/11.

WANTS CARGO FLEET TO RETAIN PRIORITY.—All who want to see the American merchant fleet not only regain but retain its high position are urged by the National Foreign Trade Council to cooperate with the United States Shipping Board in an effort to revise the navigation laws so as to lift the handicap from American vessels.

"The removal of all inequalities and injustices from the American navigation system, enabling American shipping to maintain itself upon an equitably competitive basis with other nations, with due regard to American standards of living and compensation, is absolutely essential to the permanency of the forthcoming rehabilitation of the American merchant marine," asserts the Foreign Trade Council in a report and resolution it will submit to the Shipping Board.

Accompanying the resolution is a report prepared by the Council's Committee on Merchant Marine, and signed by James A. Farrell, chairman of the council, and President of the United States Steel Corporation, and P. A. S. Franklin, president of the International Mercantile Marine Company. Edward N. Hurley, chairman of the Shipping Board, is a member of the council.

The report shows that the program of the Shipping Board covers the construction or other acquisition of 23,000 vessels of a total dead weight tonnage of nearly 14,000,000 tons. The committee points out that the experience of Great Britain has proved that less than 60 per cent of British foreign trade is carried in British bottoms.

"If the carriage of 60 per cent of American foreign trade in American ships," says the committee, "would render the United States reasonably free from the necessity of employing a foreign merchant marine for its carrying trade, the program of the Shipping Board and Emergency Fleet Corporation at present under execution would accomplish the desired result.

"In 1915," continue the report, "1,871,543 tons of American shipping carried one-seventh, 14.3 per cent, of the total foreign commerce of the

United States. On this basis a fleet of 13,100,801 tons would have been required for the transportation of the entire foreign commerce of the country. But on the basis of British experience, an American fleet of 7,860,000 tons would do the proportion of carrying of American foreign trade that naturally would fall to American ships. The present American program, that is calculated to produce an aggregate of nearly fourteen million tons of shipping within two years, will furnish, on this basis of estimating, ample provision for the carriage of the normal 60 per cent of American foreign commerce in American bottoms, with a liberal surplus of American shipping for participation in the carrying trade of the rest of the world."

The report calls attention to the fact that six months after the proclamation of peace the emergency powers delegated to the President cease, and that five years after the end of the war all operation of merchant vessels by the Emergency Fleet Corporation must cease. Thereafter the Shipping Board "may sell, lease or charter" government vessels to private citizens, and it must not undertake operation of these vessels through government agencies until after a bona fide effort to secure their operation through private enterprise has failed. The report continues:

"The question, when peace comes, will be of operation rather than of provision of more ships. The shipbuilding industry of the country, enormously stimulated by war conditions, will face curtailment rather than further expansion. The huge development for construction of wooden ships, made possible only by war and the ravages of the submarines, must be almost wholly abandoned or reorganized for other services.

"When the government comes to sell or charter the vessels of its merchant fleet to private organizations there will be the opportunity to arrange conferences in the different trades, which will establish rates in harmony with costs of operation and at levels, which will encourage the growth of American trade with all markets, fair to both shipper and ship owner; control tonnage insuring a sufficient supply for all requirements, and in general effect and maintain a standardization of conditions that will make for the successful operation of the rehabilitated American merchant marine. At the same time sufficient supervision of foreign bottoms may be maintained through control of clearance and by other means to prevent undue advantage to foreign ships with regard to American commerce."—*N. Y. Times*, 12/11.

BUILDERS ASK NEW TERMS.—The shipbuilders of the country have laid before the Shipping Board a proposition, necessitated by the increasing cost of labor, that amounts practically to a request for new contracts, at a higher level, on an enormous tonnage now in course of construction. It would add probably millions to the cost of the shipbuilding program, but the mere matter of dollars and cents involved is the least disturbing factor in the discouraging situation in the shipyards.

The construction of merchant tonnage is not progressing satisfactorily, especially with respect to the commandeered ships that were building on American ways when war was declared. Much of this tonnage was in course of construction for foreigners, and its rate of completion at the present time runs all the way from 5 to 90 per cent.

All of these partially finished ships, amounting on the Atlantic coast and in lake yards to upward of 1,000,000 tons, were commandeered by the government, which assumed the contracts.

Work on nearly all of this tonnage, which represents the bulk of the merchant shipbuilding now in progress in the country, is slowing up from causes attributed chiefly to the exorbitant demands of labor.

The contracts, assumed by the government in June, were made in many instances a year ago. Since then the labor market has undergone profound changes. Labor has been winning in its efforts to gain for itself advantages in hours and wages regardless of the war necessities of the United

States, a scale of pay so high that it is now said to be impossible for the shipbuilders to fulfill the contracts under which the commandeered ships are being made, except at a heavy loss.

The consequence is easily observable to those who are following the shipbuilding program. The big shipyards of the country are said to be devoting themselves more particularly at present to the construction of the various war vessels which they are building for the navy, and are not showing that disposition to hurry the completion of the new and badly needed merchant marine which is regarded as essential to the successful prosecution of the war.

One reason for this may be found in the fact that vessels built for the navy are constructed under contracts which call for payment on a basis of cost plus a reasonable and fair percentage of profit. Hence the shipbuilders are able to see their way to protection against losses on the ships they are building for the Navy Department, since, regardless of the upward trend in the labor market, their profit will be assured.

In view of the fact that the need for naval ships is as pressing a national necessity as is that for merchant tonnage, it is perhaps only reasonable that the shipbuilders should concentrate their efforts on this class of tonnage.

Although comparatively few of the fabricated steel ships are actually under way, the high wage scale of mechanics in the shipbuilding trades is affecting their construction in the same way that it is affecting the speeding-up so urgently desired with respect to the commandeered ships, which represent a considerable percentage of the total merchant shipbuilding in progress.

With a wage scale under which common laborers and helpers in the shipyards are to receive $3.25 a day, the figure fixed by the shipbuilding labor adjustment board on the Pacific coast, the shipbuilders are finding themselves in an economic situation from which there would seem to be no extrication except by shifting the burden of the advancing wage scale to the government.

Increases of pay in government navy yards, where adjustments of wages at higher levels have been in progress from time to time, inevitably set the pace for increased wages in the shipbuilding trades generally. Thus it would appear that the government is confronted by a condition for which it has been itself responsible in considerable measure.

This whole question, it is understood, was thrashed out at the recent conference between the shipbuilders of the eastern yards and the Shipping Board.

The board has not yet announced any decision in the matter, but there is a feeling prevalent that some action will be taken to meet the conditions complained of. An arrangement similar to that under which ships for the navy are being built is expected in some quarters to be the final outcome, and a decision by the board is expected within a short time. Doubtless it will be accompanied by a statement setting forth the facts in such a way that will determine the reasonableness or unreasonableness of the shipbuilders.

A considerable tonnage of lake ships has lately been added to Atlantic coast shipping. The bringing of ships from the Great Lakes to the Atlantic seaboard is not a new feat of transportation. It has been done frequently in the past. Heretofore these ships had to be sawed in half, in order that they could be taken through the locks of the canals through which they were carried, and they then had to be put into drydocks, on the coast, in order that the two halves might be joined together again.

This was a process that consumed time, and at present available drydocks on the Atlantic coast are scarce.

The new lake vessels recently added to the ocean merchant fleets have been sawed in two, as heretofore, but a new process has been invented whereby the two parts can be joined together while they are in the water, thus obviating the necessity of sending them to the drydock. The parts

have been transported through the canal from the lakes to Montreal, put together in the St. Lawrence, and sent to Atlantic ports under their own steam, without ever going into drydock. In this way a considerable tonnage has just become available.—*Washington Post*, 6/11.

CHANGES IN EMERGENCY FLEET CORPORATION.—Another readjustment of the organization of the Emergency Fleet Corporation of the United States Shipping Board went into effect November 12 as part of a determined effort to make good the prediction that 6,000,000 tons of ships would be turned out by the end of 1918.

One of the most important changes, it was stated, would put Charles A. Piez, a Chicago engineer, recently elected Vice-President of the Fleet Corporation, in charge of the actual construction of the vessels and place in his hands the many problems confronted in obtaining materials and a more complete spirit of cooperation with the builders.

James Hayworth of Chicago, one of the large contractors of the country, will, it is said, specialize on the work of building wooden ships, contracts for 310 of which have been let. It is doubtful if any more of these ships will be constructed after the present contracts are out of the way.

Reports that he intended to retire were denied by Rear Admiral W. C. Capps, General Manager of the Fleet Corporation. There have been many such rumors, and it has been reported also that Rear Admiral F. T. Bowles, now supervising the work on commandeered ships and wooden ships, would follow his lead.

One explanation of the reorganization was that ships were not being constructed with the rapidity expected, that several of the builders had complained of a lack of co-operation on the part of officials of the Emergency Fleet Corporation, and that materials were not being obtained in sufficient quantities.

The first direct intimation that there was to be an alteration of methods came with the appointment of a Production Committee headed by Mr. Piez, President of the Link Belt Company of Chicago. The other members were Mr. Heyworth, A. J. Mason of Chicago, an engineer, Charles Day of Philadelphia, and Frank Kirby, naval architect, of New York.

These men made a tour of the shipyards on the Atlantic Coast to study the situation, and it is probable that all of them will act in some capacity to introduce efficiency and drive into the situation. Mr. Day has gone to London to study there the fabricated ship turned out by the English, and probably will attend sessions of the allied conference in an advisory capacity, as a representative of the Fleet Corporation.

The effort of the new Vice-President of the Emergency Fleet Corporation will be in the direction of applying business methods to the shipbuilding program. The great fleet of merchant ships had been designed and most of the contracts let, it was pointed out, and it was absolutely necessary for the sake of speed in construction to introduce the best brains in American business into the work.

Mr. Mason probably will devote much of his time to field work, so that he may have a comprehensive knowledge of conditions in all yards and be prepared to recommend reforms in methods which will make for quicker work.

One of the most serious problems has been in connection with the wooden ship construction, as the Southern Pine Association has been able to supply the materials in the quantities demanded and meet the requests of the government for cantonment construction and other vital war work. Upon the recommendation of Mr. Piez and his associates the large sizes of lumber required for shipbuilding will be brought on from Oregon and substituted for the pine. The Priority Board will be asked to supply special trains and give them the right of way to expedite this plan.

Efforts will be made also to iron out the differences which have cropped up between some of the builders and certain representatives of the Fleet

Corporation. At least one large association of builders has prepared a formal complaint, stating that the members were unable to get all of the materials required and that work was further interrupted and delayed by changes in specifications.

Officials of the Shipping Board are determined to make good the prediction of 6,000,000 tons deadweight by December 31, 1918, and the completion of a 10,000,000 ton program as early as possible in 1919. The 6,000,000 tons include about 2,500,000 tons of ships which were commandeered on the ways.

Under present conditions it had begun to appear doubtful if the work set would be done. Exemption of shipyard employés and others engaged in the manufacture of parts essential to ship construction, it is felt, will provide the necessary labor for double or even triple shifts. With this accomplished it is believed that the original mark can be met and perhaps surpassed under the new efficiency program.

John Barton Payne, who was made counsel of the Wage Adjustment Commission which went to the Pacific coast, will take up his duties as general counsel of the Emergency Fleet Corporation, and will co-operate in the efficiency program.—*N. Y. Times,* 11/11.

Mr. Piez in Supreme Charge.—The reorganization of the Shipping Board's Emergency Fleet Corporation puts Charles A. Piez in supreme charge of the government's shipbuilding program. Rear Admiral Capps, appointed by President Wilson as general manager, will continue in that position, but much of the work he has done heretofore will be taken over, it was said, by Mr. Piez.

Duties that have been performed by some of Admiral Capps's aids, most of them naval men, will be taken over to a large extent by engineers, who will serve with Mr. Piez. Wood ship construction will be put in charge of James Heyworth, who displaces Rear Admiral F. T. Bowles, retired. The building of fabricated steel ships will be under the supervision of Charles Day.—*N. Y. Times,* 11/11.

FASTER SHIPS.—Transatlantic liners and other passenger ships built in the struggle for commercial supremacy of the seas after the war will be larger and faster than any before because of the great improvements in marine machinery and naval construction made by necessities of the war, according to the prediction of a British naval expert writing for *The London Times.* He says he would not be surprised to see the speed of liners increased to 40 or 45 knots an hour, or even more, by the use of oil fuel, water-tube boilers such as are now used in the latest types of destroyers and double-reduction geared turbine engines that the expert says are sure to be built for merchant ships after the war. This expert says there is practically no limit to the speed ships may attain with new improvements and by sacrificing space in hulls.

"Vessels of war and merchant ships are given speeds suitable for the special work they have to perform," says the British writer. "An interesting illustration is given by an examination of the different types of warships. In any vessel there is a definite weight, made up of various items, which must be exceeded. It includes the weight of hull and fittings, machinery, armament, fuel and stores. It is, however, within certain limits, in the hands of the designer how he shall allocate these weights. In torpedo-boat destroyers it is possible to keep the weight of the hull comparatively small since the nature of their work does not demand heavy scantlings. Armor is entirely absent, and the armament quite small. In consequence, there is a good deal of weight available for the machinery, which means that great power can be put into the boat and a high speed obtained. In light cruisers, different considerations obtain. The speed is sacrificed somewhat so the machinery weighs relatively less, leaving more weight available for light armor and for heavier armament than the destroyer possesses. This result is not achieved, however, without making

the cruiser larger than the destroyer. Larger ships can be driven at the same speed as smaller ones, with relatively less power in the machinery, so that in the cruiser there is an appreciable weight left for the armor and armament.

"This principle of the easier attainment of speed with increase of size is followed through into heavy battle cruisers. These vessels require heavy armament and moderately heavy armor, but in addition they must have good speed. The result is that they become very large vessels, their length being particularly great, as it is the most important factor in the development of high speed. In the battleship high speed is not considered of such great importance, but both armor and armament must be heavy. The speed, however, is sacrificed to such an extent that it becomes possible to build battleships of smaller length than battle-cruisers.

"What has been said of warships is also true in principle for merchant vessels. In the slow-moving cargo ship the object is to carry as much cargo as possible. As a result the speed is kept low, so that the weight of the machinery is small and the vessel can be made with full under-water form, thus insuring that the maximum weight of cargo will be carried. To obtain a greater speed in an intermediate type, or a vessel carrying a few passengers, cargo weight is sacrificed by the heavier weight of machinery carried and generally by making the under-water form finer than in the cargo ship. In the ocean liner the under-water form is made still finer, and on account of the great weight of the machinery comparatively little cargo is carried.

"It is obvious that the more horsepower is obtainable from a ton weight of machinery the greater the speed that can be given to any ship, and in this way the limiting speed of a vessel can be increased. Enormous strides have been made in this direction since the days of the early reciprocating engine. The great increase in the speed of torpedo-boat destroyers is almost entirely due to such improvements. Water-tube boilers generate much more speed per ton weight than cylindrical boilers, and their introduction allows more power to be obtained in a given ship. Turbines are also lighter than reciprocating engines and have the same effect.

"Twenty years ago the attainment of a speed of 20 knots in a Channel steamer 300 feet long was a remarkable achievement. Some few years ago, however, a speed of 25 knots was obtained on a similar vessel of the same length. The first ship was fitted with triple-expansion engines and tank boilers, while the latter had geared engines and water-tube boilers. After the war, when new steamers will be built, something even better may be expected, since double-reduction geared turbines will almost certainly be fitted. These are lighter than the single-geared turbines.

"In addition, should the supply of oil fuel become assured and its price reasonable, its adoption would render the attainment of still greater speeds possible. Oil fuel generates steam more efficiently than coal, thus reducing the weight of the boilers. A smaller weight of it needs to be carried to give the same steaming radius as coal. The load of the ship is therefore less, leaving more weight available for machinery, by which a further increase of speed can be obtained.

"It is doubtful if there is any limit to the speed of a ship if everything else is sacrificed to obtain it. Reference has already been made to the greater speeds obtainable in large ships. Disappointment is often expressed over the small speeds of large vessels, both of the navy and the mercantile marine. The reason has been given that for war vessels and merchant vessels it would not be profitable to run at great speeds. It would be quite possible to build a ship to run at, say, 70 miles an hour, that is, at the speed of a railway train. Needless to say, she would have to be of great length, over 1000 feet, and everything in the way of weight would have to be sacrificed. She would, in fact, be something like a torpedo-boat destroyer magnified enormously. Small models of ships have, of course, been run in experimental tanks at great speeds, which if produced proportionately in

actual ships would be even greater than 70 miles an hour. If, however, ships could be made large enough to carry the necessary machinery these speeds could be obtained. The lighter the machinery can be built, the smaller the ships can be made to attain these great speeds.

"Theoretically, there is no limit to the speed of ships, but practical politics fixes one. The late W. Froude estimated the horsepower required for a special type of ship of 2500 tons displacement. The maximum speed he calculated for was not less than 130 knots, with a horsepower of about 1,000,000. Needless to say, such a small ship could not carry the machinery to generate this power.

"At the present time speeds of 45 miles an hour have been obtained, and improvements in machinery will increase this value. There is no reason to suppose that these improvements will not take place. This much is certain, that if oil engines could be built to give the large powers required in high-speed ships a distinct advance in speed would at once be brought about. The future is bound to see an increase in the speed of ships."—*N. Y. Times*, 4/11.

SHIPYARD MEN TO BE QUARTERED ABOARD SHIPS.—The Shipping Board probably will adopt the suggestion made to it by Charles W. Morse that river passenger steamboats be used to house the men employed at the various shipbuilding yards on the Atlantic coast. Edward N. Hurley submitted the proposition to Secretary Baker.

The housing of the men has been one of the perplexing problems over which the Shipping Board has been working for many weeks, and the suggestion of Mr. Morse affords a solution so satisfactory and so simple that the members of the board are asking themselves why it had not occurred to them.

The passenger steamboats plying between New York and Albany, the Atlantic Highlands, Coney Island and the Jersey coast number not less than 25, and the *Grand Republic* alone will accommodate nearly a thousand men. All of these vessels will be taken over by the government at a rental to be agreed upon between the Shipping Board and the various owners. The advantages of this means of housing the men are numerous, but the most important are that these vessels are available immediately and can be moved to any point at which the necessities are most urgent. In addition to these features, many of these steamboats have kitchens and the men can get their meals on board. The Shipping Board probably will install kitchens on those not provided with them at present. It was stated at the Shipping Board that few, if any, of the steamboats accommodate less than 700 men. Housing facilities, therefore, will be immediately available for approximately 18,000 men on the vessels plying out of New York alone. The Shipping Board contemplates taking over vessels from other parts of the country.

While no definite statement was made at the Shipping Board on the subject, it is expected the steamboats taken over now will be used merely during the winter and early spring months and that permanent quarters will be erected at the several shipyards for the men and their families. The citizens of New York and other seaport and river cities depend in summer largely upon the fresh air obtained by evening trips on these steamboats, and the government, it is believed, will not jeopardize the health and interfere with the pleasure of the civilian workers by appropriating permanently these vessels.—*N. Y. Herald*, 2/11.

SUBMARINE BOAT COMPANY.—It is estimated that about two years will be required to complete the 200 5000-ton ships, which the company will build for the government, the first launching occurring early in 1918.—*The Magazine of Wall Street*, 27/10.

SHIPPING LOSSES.—The latest official figures obtainable by the U. S. Government, based on actual losses in the month of September, show that

the Huns are not sinking more than 370,000 tons gross of shipping a month. This is considerably below the boasted prophecy of a million tons a month made when America entered the war. Reduction in losses is said to be due chiefly to the convoy system, by which 50 and 60 cargo ships are taken simultaneously through the danger zone by a cordon of American destroyers.—*Shipping*, 20/10.

THE "DARVEL" WRECKED.—The steamship *Darvel*, formerly German, which for some time has been in the control of the United States Navy, is a total wreck on Stresi Island. The crew was saved.

The *Darvel* formerly belonged to the North German Lloyd Steamship Company. She was of 1508 tons gross and was built in 1905. Her home port was Bremen.—*N. Y. Herald*, 22/10.

THE DEVELOPMENT OF CONTINENTAL SHIPPING AND HARBORS.—The neutral nations would be more than human if they did not see in the U-boat campaign an opening for them to secure a greater share in the carrying trade of the world, which has hitherto been largely in British hands. After the declaration of peace there will be an immense demand for raw materials to stock the factories of Europe, and of manufactured goods to supply the needs of distant countries. Neither Britain nor Germany will be able to furnish the necessary tonnage, and cargoes will be offered to every shipowner who can carry them. While the combatants are devoting all their energies to the war the opportunity occurs for the neutrals to prepare for the future, by enlarging their harbors and by building new vessels. In Holland a new scheme has been prepared for the deepening of the waterway from Rotterdam to Dordrecht, to make that ancient town a regular seaport. The new waterway will follow an arm of the Meuse, which at the east end of the island of Roozenburg branches off from the Rotterdam channel. The distance from that point to the harbor at Dordrecht is 27 km., and the channel is to be deepened so as to allow vessels of 8 mm. (26 feet 3 inches) draft to proceed to Dordrecht. The new channel will be from 200 mm. to 260 mm. broad, with a narrower channel, 100 mm. broad, 7½ mm. (24 feet 8 inches) deep, the middle of which, for a breadth of 50 mm. (164 feet) will be 8½ mm. (28 feet.) deep. The cost is calculated at 4,000,000 gulden (330,000*l.*). Holland has already started a new passenger line from Amsterdam to America, and through the Panama Canal to India; this route has been chosen on account of the war, but is not unlikely to be kept in the future. Another new Dutch transpacific line is to start from San Francisco and call at Honolulu, Yokohama, Nagasaki, Hong-Kong and Singapore. Most of the Dutch steamer companies have paid enormous dividends for 1916, four concerns paying no less than 100 per cent; the Holland-American line has paid 55 per cent, the Zeewart Company 50 per cent, etc. Still the business of Holland's most important port, Rotterdam, has receded very materially during the war, and the number of arrivals and sailings has fallen to what it was close upon fifty years ago, as will appear from the following table:

	Number of Vessels	Tons
1870	2,973	1,026,348
1890	4,535	2,918,425
1900	7,268	6,326,901
1910	9,368	10,658,831
1913	10,203	12,785,861
1914	7,303	9,188,615
1915	3,644	4,153,682
1916	2,979	3,191,830

Sweden is another country which is exerting herself vigorously to facilitate the development of her shipping, and in this connection the important

harbor plans and extensions of her largest ports are of interest. At Gothenburg the necessity has been felt for some time for the construction of a deep-water port which would avoid certain drawbacks from which the present harbor accommodation suffers. A plan has now been prepared for a harbor at Käringberget. The rock bottom generally lies from 9 mm. to 13 mm. (29 feet 6 inches to 42 feet 8 inches) below water-level, and a depth of 12 mm. alongside the quay is easily attainable, this being 3 mm. more than what has hitherto been available in the central harbor. This harbor is in the first place intended for overseas traffic, and as a transit port for Baltic and canal boats, but it will hardly be suitable for the projected Anglo-Swedish steam ferry connection on account of the extensive railway accommodation required for the latter, which it would be advisable to keep separate from a commercial harbor. The locality in question is protected from the prevalent southwest winds. The length of quays with the full 12 mm. depth, according to the present plan, will amount in the aggregate to 3400 mm. (11,200 feet), in addition to which there are 915 mm. (3000 feet) of quay with a depth varying from 4.8 mm. (16 feet) to 9 mm. (29 feet 6 inches). The cost is estimated at 1,100,000*l.*

In Stockholm a large harbor extension is under consideration. Other Swedish towns are extending their harbor accommodation materially. The Malmö free harbor will be located east and north of the Mjhavn pier in immediate connection with the present harbor, and the necessary area will be obtained by dredging and filling up. The depth of water at the entrance and in the basin will be 9.5 mm. (31 feet 2 inches) which for the present is considered sufficient. The plant will comprise 17 electric cranes of 2½ tons capacity, 9000 sq. mm. area of sheds besides warehouses, and a silo of 10,000 tons capacity. The cost was estimated at about 520,000*l.* before the war.

Swedish shipyards are exceedingly busy, most steamship companies doing their utmost to increase their tonnage. The Eriksberg yard has secured contracts from the Svenska Lloyd Company for three steel cargo steamers of 3250 tons deadweight each, to Lloyd's highest class. The same yard is building three other cargo steamers of 1000 tons deadweight each and two of 1800 tons. The Svenska Lloyd has a number of other steamers in course of construction; the Oscarshamn yard is building the *Catalonia*, 2900 tons, and has delivered the *Marsilia*, 2985 tons; the same yard has further contracts for one steamer of 2500 tons and two of 2400 tons each. The Lindholmen yard is building the *Scotia*, 3200 tons, and the Bergsund yard the *Holmia*, 2900 tons, etc. All the boats have to be ready in the course of the next three years, and when delivered the company will, barring accidents, have 51 steamers with an aggregate tonnage of 113,140 tons deadweight. In addition, the Svenska Lloyd has just secured a controlling interest in the Nordiska Raderiaktiebolag, Gothenburg. At the new Öresund yard in Landscrona the keels have been laid for the first 10 steamers, each of 1800 tons.

The largest Swedish-built motor vessel was some little time ago delivered by the Södra yard in Stockholm to a Gothenburg firm; it is built to German Lloyd's highest class, the dimensions being 227 feet length, 34 feet breadth and 14.5 feet draft with full cargo. There are two Diesel motors, from the Swedish Diesel Company, of an aggregate power of 875 indicated horsepower, and the speed is 10 knots.

The Norwegian yards are very fully employed. The Moss yard has recently launched a couple of boats of 1850 tons deadweight, and the building of a third sister vessel has at once been commenced. Norwegian shipping has, on the whole, done exceedingly well during the war, and in the course of 1916 the Norwegian merchant marine has earned far larger profits than during any previous year. The increase in tonnage during the year was not of much importance, being only 35 vessels of 5880 tons, while the losses were very great.

In Spain there has been commenced, in a yard at Valencia. the building of wooden vessels for several Spanish owners, to designs of a Philadelphia expert; the sizes will be from 480 tons to 1000 tons deadweight, and the vessels will be fitted with Diesel motors and electric auxiliary machinery. Another Spanish yard, the Vea-Murginia, in Cadiz, which has been lying empty for the last decade, has been sold to a Spanish shipping concern for a sum of 1,300,000 pesetas. The new owners will immediately commence the building of six cargo boats of 6000 tons deadweight each, and a number of extensions have been decided upon, including a floating dock with a capacity of 20,000 tons, new slips, etc.

While the neutral nations are busy increasing their harbors and their tonnage, our enemies and our Continental Allies are quite alive to the necessities of the future. Germany is clearly much concerned as to the position of her merchant marine after the war. She views with apprehension the progress made by other nations, and special attention is being paid to the amalgamations among English shipping companies. In the meantime a German estimate of the shipping losses during the war may be of some interest, although it cannot claim complete accuracy. The number of vessels lost as prizes, from mines, or torpedoing, is put at 152, with an aggregate tonnage of 410,600 tons; in hostile harbors there remains 311 vessels, of an aggregate tonnage of 807,200 tons, but this does not include vessels lying in the ports of the United States, 32 vessels with an aggregate tonnage of 364,000 tons, which must be deducted from the 621 vessels of 2,341,000 tons, put down as remaining in neutral ports, from which also those in China and Siam now have to be deducted. This makes a total loss of some 1,600,000 tons out of a total of 5,550,000 tons at the beginning of the war, in addition to which some 2,000,000 tons have been lying idle in neutral ports for more than three years; as has also the greater portion of the tonnage in German ports.

Vague rumors have been circulated about the large amount of tonnage which has been built at German yards during the war, but careful students of German affairs are extremely sceptical on this point, as about all other reports of Germany working to stock in other industries so as to be able to throw large quantities of manufactured goods on the market directly the war is over. There has been neither labor, nor raw materials, nor money for such purposes, and neutrals who have had frequent opportunity of visiting the industrial towns during the war are convinced that Germany is literally empty.

The state aid to German shipping, as now projected, entails a grant of some 1,250,000,000 marks in all, the money, as far as the shipping companies are concerned, being intended for the purchase of new tonnage. Although the terms financially may not leave much to be desired, there are unpleasant prospects of state control looming in the future. Of compensation for the direct losses arising from the war there seems to be no prospect at present. Of course a number of orders have been placed with the home yards, but comparatively little is known as to the state of advancement of the contracts. Herr Hugo Stinnes continues to show his confidence in shipping, and has ordered five steamers from the Vulkan yard at Vegesack, three of 12,500 tons each, one of 5000 tons and one of 4000 tons. This yard, in addition to these five boats, has six more building of 12,500 tons each, most of which have to be ready within a year after the conclusion of peace. The Tönning shipyard has been converted into a company, with a capital of 1,750,000 marks, for building standard steamers, and 15, of an aggregate tonnage of 55,000 tons, have already been ordered. A floating dock will also be constructed. In the interests of shipping harbor extensions have been planned in several places; in Bremen, for instance, it is proposed to deepen harbor No. 1 from 8 m. to 8½ m., and harbors Nos. 2 and 3 from 8 m. to 9½ m., in addition to which the south pier of harbor No. 1 will be rebuilt.

Another outcome of the war is the formation of a German Lloyd's on similar lines, as far as possible, to those of the English Lloyd's, with headquarters in Hamburg and branches in Bremen and Berlin. Although Germany felt herself at a disadvantage in this respect before the war, no independent movement was then contemplated. The annual expense is calculated at 2,000,000 marks, of which one-fourth is expected to be covered by annual subscriptions from some 500 members, whilst the balance will have to be provided in other ways.

Austrian shipping is naturally faring badly during the war, and for most of the companies with a large portion of their tonnage lying in foreign ports the payment of a dividend has been out of the question. This applies to the Austrian Lloyd, the Tripkovitch Company, the Free Shipping Company and the Austro-American line. The Dalmatia, with a fleet of some 30 boats engaged in the coasting traffic, was able to pay 6 per cent last year, against 5 per cent for the preceding year. The Austrian steamship owners are preparing two combines or unions, one for liner concerns, with some 400,000 tons, and one for tramp boats, with some 600,000 tons. This is partly done to anticipate any state interference.

The Roumanian merchant marine is still in its infancy, having in reality only existed a couple of decades, and in the year before the war it comprised only a dozen steamers. There were the Orient line and the Occident line, the former trading to Constantinople, Smyrna, Piraeus and Alexandria, with five boats, averaging 7000 tons and a speed of 18½ knots. The Occident line traded between the Mediterranean ports, and even to Northern Europe, England, Belgium, Holland and Germany; the boats were about 2200 tons, and seven in number. The shipping traffic of Roumania, however, is by no means without importance, and has increased largely during the last few years. In 1913, for instance, the vessels entering all the Roumanian harbors on the Danube included 90 French, 6876 Austrians and 120 German vessels. Vast sums have been voted by Bavaria for the improvement of the Danube waterway, and other large schemes are under consideration. Should Roumania after the war choose to deal with the western nations in preference to developing its up-river traffic, it is feared in Germany that much of the money devoted and to be devoted to the improvement of the Danube waterway will have been expended in vain.

Italy has followed the example of England in the amalgamation of several shipping concerns, viz., the Peirce shipping firm and the Sicula Americana, which jointly have taken over one-half of the capital which is fixed at 100,000,000 lire, whilst the other half has been provided by the Navigazione Italiana and the Italia Company. The new company will commence with a fleet of 14 of Italy's largest boats, but additional tonnage will be procured as soon as practicable. Naples will be the headquarters of the new company, which bears the name Transoceanica.

It is becoming more and more difficult to form a satisfactory estimate of the conditions of business after the war. That there will be an enormous demand for all kinds of raw material and manufactured goods is quite certain, for the world has been living on its means—or beyond it means—for three years. Peace is not yet in sight, and even after it is declared it will be a considerable time before we can revert to our normal commercial activity, for demobilization is always a slow business. Apart altogether from the losses caused by U-boats, there has been a steady reduction of tonnage by storm, fire, collision and stranding, while the customary replacement has dwindled to comparatively small figures. A great increase of tonnage is urgently called for; and, however active the neutral nations may be in shipbuilding, it is certain that they cannot supply more than a small fraction of what is needed. The demand for new shipping after the war will be most urgent, and for some time the question of cost will not interfere with the placing of orders. But that happy condition cannot continue for ever. The combination of dear money, dear material and dear labor must eventually cause a slackening of demand. No one can say when

that will come, but it is fair to assume that it will come later in the shipbuilding trade than in many others. So long as manufacture is brisk we must have vessels to transport the raw materials and the goods.—*Engineering*, 14/9.

AERONAUTICS

TEST FIRST U. S. BATTLE AERO.—The first fighting airplane wholly made in America of American materials has taken the air in successful test flights. In making this fact known recently the officials of the aircraft production board said few changes in the design of either the plane or the Liberty motor are believed necessary, and that production in quantity of the fighting machines soon will be in progress in many factories.

By the first of the new year it is expected that the aircraft program will be well under way and by July 1 the government expects to be able to supply any demands of its allies.

Machines which United States forces in Europe will need when spring comes are being built abroad.—*Army and Navy Register*, 10/11.

ARMY AND NAVAL AIR BOARD NAMED.—Naval and military members of the Aircraft Board, about to be reorganized under a law giving it legal status, were announced October 26 by Secretaries Daniels and Baker. President Wilson is to name a civilian chairman and two other civilian members.

All of the service representatives appointed, except Lieutenant Commander Arthur K. Atkins, of the navy, are members of the present board. They are: Navy, Rear Admiral Taylor and Captain H. E. Irwin; Army, Major General George O. Squire, Colonel E. A. Deeds and Colonel R. L. Montgomery.

Brigadier General Benjamin D. Foulers, Colonel Raynal C. Bolling and Colonel S. D. Waldon will be dropped, but will continue their services in connection with aeroplane production.—*N. Y. Herald*, 27/10.

AVIATION STATION BUILT ON THE ANACOSTIA FLATS.—An experimental aviation station has been established by the Navy Department on the newly reclaimed flats of the Anacostia River, just opposite the Washington Navy Yard. It is equipped with a hangar, 100 by 200 feet in dimensions, which has a floor space of 20,000 square feet, and is designed to house a small fleet of hydro-aeroplanes. The floor and foundations of the hangar are of concrete and the framework of wood. Two concrete runways extend from the entrances of the hangar to two launching piers at the water front. The structures were built under rush orders and were completed in 18 days.

The station is designed to meet the long-felt want of a convenient landing place for the fleet of naval airplanes to be used in experimental flights in this city and vicinity. The air machines now housed at the local navy yard will be transferred to the new hangar on the opposite bank of the Anacostia and several more machines are to be brought here from stations in other localities where the facilities for the desired experiments are not so good. With their arrival, the sight of airships sweeping gracefully over the National Capital will become such a frequent occurrence as almost to escape comment. It is said that the construction of the new aviation base on the Anacostia cost only $30,000.—*Washington Star*, 10/11.

CAUTIONS AMERICA ABOUT AIR PROGRAM.—Major General Sir David Henderson, who is retiring as head of the British Air Board to undertake an important "special duty," in an interview with *The Associated Press* praised the American air plans, but warned against the danger of overdoing standardization in aircraft. He expressed the belief that the American public should be prepared for "fairly severe" losses in air training.

"I shall not say much to you about the plans of the British air service for the immediate future," Sir David said. "That would be giving information that the enemy is very anxious to obtain. The Germans are acutely alarmed over the preparations that the Entente Allies are making for the air war next year.

"The British flying corps is from 70 to 100 times larger to-day than at the start of the war, and we have made this tremendous augmentation at the same time that we have been carrying on a war that involved heavy losses and continual replacements from the very first day.

"We all have been tremendously impressed with the plans of the United States for the air service. I think you will be extraordinarily successful. But I am very anxious that what you are making for yourselves next year shall not react to the detriment or delay of what we ordered in the United States long since and need for immediate use. There are certain airplane materials for which we are absolutely dependent upon the United States, such as spruce.

"We have been getting a fairly regular supply of training machines from the United States. It is very necessary that we should continue to get these machines for training our pilots, and any check in the supply would seriously hamper our production of pilots for the spring offensive.

"Sometimes, I get a little nervous about these matters, but I have every confidence that the men in charge on your side will consider all angles of the question and act to the best interest of the whole alliance.

"I have seen only the plans of the new American airplane engine, but it looks extraordinarily good. It may have small 'teething' troubles, but I think you may rest assured you have a sound power plant basis.

"As to the production of a standard type airplane, there still is some difference of opinion. Certainly there is great danger in over-standardization. If you want the best type you must be continually improving and changing. The question the air commander must ask is how long he can afford to go on with a particular type of machine, and whether it is likely soon to be superseded by a better type developed by ourselves or the enemy.

"The Germans have been fairly successful with a policy that involves the standardization of engines and frequent changes in planes. The Germans had a certain advantage over the British at the start because they already had two good types of water-cooled engines. We started with French engines, but now have our own, and they are admittedly far superior to anything the Germans ever produced. In airplane design we always have been better than the enemy, but in the early days of the war we were at a disadvantage because our planes were under-engined."

Asked whether it were true that the British casualties in air training had increased considerably in recent months, Sir David said:

"The total number of our training casualties increased heavily, but that was mainly because so many more men were training. It must be admitted, however, that the actual percentage of casualties in training also increased slightly owing to the fact that our training has grown so much more comprehensive.

"Looping-the-loop has come to be almost a kindergarten exercise in air training, and the man training to be a fighting pilot must practice the side-slip, the tail-slide, the nose-dive, and other aeronautics of a most complicated character until he is able to do almost anything with his machine.

"Your casualties in the United States are likely to be fairly severe because you have not skilled instructors in sufficient numbers. We sent back to you a number of good men, especially some very valuable Americans who had been in the British Flying Corps, but it was impossible to spare the large numbers which are desirable for the big plans which you have under way.

"Actual field experience is most valuable training for the airmen," Sir David concluded. "No bravery or native skill can compensate for a lack of experience and training in actual war. The best airmen in the British

Army, speaking generally, are those who have been at it the longest. For instance, one of our squadrons contains 18 men, who have downed 200 enemy machines in six months, and won a victory over that superb German airman, the late Lieutenant Vosse. The leaders of that squadron are men who have had long experience at the game. They are just as daring as anybody, but they have learned by that very experience how best to protect themselves while inflicting the greatest damage on the enemy."—*N. Y. Times*, 27/10.

THE CAPRONI AIRPLANES.—The Caproni brothers, airplane inventors, when interviewed by a *New York Times* correspondent October 15 in Milan, said:

"Our company for manufacturing Caproni airplanes at Talirdo and Vizzola is now in full swing and the demand for new machines is so great that we are working incessantly day and night. For reasons easily understood, we are now prevented from giving details concerning our works, but it is enough to state that we are employing about 5000 workmen, who are rapidly increasing through the addition of new workshops. Mounting halls and hangars already are covering four times the area occupied in 1914.

"We are fully convinced that the enormous development of aviation through the war is not only to continue thereafter, but to increase by leaps and bounds. We believe the day is approaching when aerial lines not only will join town and country and country to country, but will span continent to continent with aerial trains transporting hundreds of passengers traveling from 125 to 190 miles an hour.

"Future airplanes will have to be gigantic but of light construction, most luxuriously fitted, surpassing any train *de luxe* ever seen, and having all possible modern comforts. They will be built according to the biplane and multiplane systems, and fitted with a series of motors varying from 300 to 500 horsepower, because the plurimotor types obviously afford a genuine guarantee of safety.

"However, it would be erroneous to suppose that airplanes can immediately or even in the near future replace trains or steamers. Aviation, still in its youth, must be developed gradually. People must not be impatient, but must recall that navigation by steam took 130 years to reach its present perfection.

"Aviation has had far more rapid development. Essential difficulties to overcome have been of two kinds—those occasioned by atmospheric conditions and those resulting from accidental breakdowns, which are chiefly confined to motors. The latter are almost entirely obviated through the introduction of the multimotor system, which secures greater safety, for if one motor or even two break down the journey can be continued by using a third motor until the nearest landing. In the present war many instances have occurred wherein the Caproni trimotors have found themselves amid half a dozen enemy machines, having to stand concentrated fire which struck two of their motors and tore their wings to pieces, but nevertheless have been able to return to our lines. The worst enemy of aviation is fog, which already has been somewhat vitiated.

Aviation will be especially useful for quick communication between mainlands and islands, as between Italy and Sicily and Sardinia, between England, Ireland and Europe, America and the Antilles, and ventually South America will be linked. Airplanes will replace a long and weary transport system by caravan which is both risky and costly, especially for transportation of valuable goods such as precious stones, ivory, skins, and feathers, avoiding the danger of highway robbery. Some aerial lines will go around the world.

"Immediately after the war large transoceanic airplanes will be constructed, capable of carrying aboard from 50 to 60 passengers and traveling between Europe and America. Our triplanes already can carry easily as many as 30 passengers in comfortable closed cabins, while many trips have

been made by our biplanes with 10 passengers between Milan and Turin and back. Also longer journeys have been made in America.

"Recently one of our biplanes piloted by Gabriel d'Annunzio with three others aboard accomplished without a landing a flight covering 875 miles corresponding as the crow flies to the distance between New York and St. Louis.

"Aviation in peace times will bring about extraordinary economic, political, and social changes in the life of the people of the United States. The air lord in the near future will be in a true sense 'monarch of all he surveys,' possessing and ruling a dominion of unlimited power and importance and superseding the lord of the seas. Aviation demands legislation, state, interstate, intercountry, and intercontinental. Governments must be put in a position to control aerial flight.

"There is now the theoretical difficulty of crossing frontiers which raises a question of custom house duties and international problems. Arrangements must be made between different countries to organize an international aerial service on lines something like those already existing for international postal service."—*N. Y. Times,* 16/10.

CURTISS AEROPLANES.—The Curtiss Aeroplane and Motor Company is producing 11 complete aeroplanes a day. Work is progressing on two large flying ships which have extreme width of 90 feet. These water planes carry a very substantial boat, to be mounted with one 3-inch gun each, and manned by four or five men. Reports are current that a contract had been arranged between the U. S. Government and the company whereby the latter was to provide 1400 machines at the earliest possible moment. The price, without motor, is understood to be about $4750 each.—*The Magazine of Wall Street,* 27/10.

AIR RAID PRECAUTIONS IN LONDON.—The Police Commissioner of London has issued, for the guidance of the public, a set of rules to be observed in case of a hostile aircraft raid. In view of the possibilty of Germany developing submersible seaplane carriers from which American shores might be bombed, it seems interesting to review here these rules.

Do not pay heed to mere rumors of a raid, but as soon as you know, whether from a public warning or from the anti-aircraft guns coming into action, or from the explosion of bombs, that an attack is imminent or has begun, take the best cover near at hand.

Do not wait till you see the aircraft nearly overhead or hear the explosion of a bomb near you. You cannot tell how near the next bomb may fall, especially at night, and apart from the danger from bombs, fragments of shells may fall a long way from the guns. To stay in the open involves needless risk, even if the attack seems a long way off.

If you are in the open, go into the nearest available building. A doorway or open archway, though better than remaining in the open, is not good cover, as it affords little protection against fragments of a bomb exploding on the ground.

If bombs are being dropped and there is no building near, it is better to lie down on the ground in the best ditch or hole you can find near at hand, or behind a strong wall or tree, than to remain standing in the open.

If you are in a building on the top floor, go downstairs, where you will have the best available cover overhead, avoiding elevator openings, open stairways and parts of the building under skylights.

Do not look out of windows, but keep in a part of a room or passage where you will be out of the line of fragments of metal or debris, which may enter by a window or door of a bomb should explode outside.

Do not crowd in a basement with only a single means of exit. The fumes from all bombs are injurious if breathed in any quantity, and it is advisable to have a second means of exit in case fumes should enter, or a gas pipe be broken, or rapid escape be necessary for any other reason.

Water is far the best extinguisher for general use against fires caused by incendiary bombs, and should be applied as promptly as possible. Keep a supply of water ready in buckets or cans, some on each floor, if possible. See that they are kept filled.

A supply of fine dry sand or soil may be kept ready in pails or scuttles, in addition to water, especially where there are inflammable liquids which might be set alight. See that the sand or soil does not cake.

If the gas is turned off at the meter, see that all burners are turned off as well; otherwise there will be serious risk of fire or explosion when the gas is turned on again.

Be careful not to breathe fumes given off by bombs. Do not go near where any bomb has fallen unless it is necessary to do so for rescue purposes or to extinguish a fire, or unless you are sure all fumes have cleared away.

If a bomb falls near you, get away from the place where it has fallen as quickly as possible, and keep away until the air has cleared. If you are indoors and fumes have entered the building, go out into the open away from where the bomb has fallen, and if the raid is not over, find other shelter.

While good cover is the point of most importance, choose, if you can, rooms, corridors, etc., where in addition to cover overhead there are alternative means of exit, so that if fumes should enter from one direction you may be able to escape the other way.—*Aviation*, 1/11.

GERMAN MACHINES.—The Germans are employing the Zeppelin type of airships for two purposes, namely, naval reconnaissance in conjunction with fleet actions and for offensive operations, the latter chiefly against the British Isles. While highly efficient in the pursuit of the first named object, the Zeppelin has proved much less satisfactory in bombing raids.

For offensive operations the Germans use the gigantic super-Zeppelin type of 56,000 cu. m. volume, which has an outer cover of silk, a speed of 62 miles per hour and carries four quick-firing guns, 10 machine guns and 4 tons of explosives.

Better results appear, however, to have been attained with a smaller scouting type of Zeppelin which has a volume of only 30,000 cu. m., a speed of 56 miles per hour, and carries two quick-firing guns, six machine guns and two tons of explosives.

(The quick-firing guns mentioned may refer to the automatic guns of ½-inch bore of which three were found to be mounted on the *L-33*, a Zeppelin which was brought down in England last fall by British aviators.—EDITOR.)—*Aviation*, 15/10.

AIR RAIDS AND SOME CONCLUSIONS.—First, let us deal with air raids against the two capitals. If we presume that the German raiders start their flight from some point in Belgium, Bruges for instance, the distance to London, taking a direct route, is only about 140 miles, 100 of which are over the sea. From the time when the raiders cross the English coast to the time when they arrive over London only about half an hour elapses, which leaves little time for giving warning and sending airplanes up in pursuit, although it is true a somewhat longer warning of their approach should be available through our organized system of defence.

On the other hand, the distance from a point on the French front, as Verdun or Nancy, for instance, to Berlin is in the neighborhood of 430 miles, giving a total distance to be covered of 860 miles. This is in itself a serious problem to solve from a technical point of view, quite apart from the fact that it is to be expected that every mile of those 860 will, figuratively speaking, be contested by the enemy's anti-aircraft defences. Opinions as to the possibility of making the round trip are probably divided.

As for ourselves, we have for some time been firmly convinced that it can be done, and we feel quite confident that it will be done. We are keenly aware of the difficulties and do not underestimate these, but it is now already many months since a French pilot flew to Berlin and thence to within a few miles of the Russian front. It is true that this pilot did not drop anything more frightful than pamphlets on Berlin, but so rapid is the development in aviation that to-day there are undoubtedly in existence machines capable, with comparative safety, of the round trip of 860 miles. That we are justified in this assumption appears to be confirmed by the report published last week of the Italian aviator, Captain Giulio Laureati, covering a distance of approximately 1000 miles on a new Italian airplane. The possibilities opened up by this splendid flight are enormous.

Berlin may now be said to be within bombing distance of either the French or Italian fronts, and if the Huns persist, the day should not be far distant when bombs instead of pamphlets are showered on Wilhelmsstrasse. If Berlin were the only objective to be aimed at, the time for warning would necessarily be so long as to enable the enemy to make all his preparations beforehand and be ready for our bombers long before they got to Berlin. Since, however, large portions of Germany are within the 500 miles radius—in fact, all of Germany except East Prussia—there are a number of points where attacks from the air could be made with advantage.

Thus we have, in Germany, the industrial centers of Westphalia and Krupp works at Essen, for instance, the shipping port of Hamburg, the fortifications and shipyards all up and down the German North Sea coast, not to mention the Kiel Canal itself. In the south there are such places as Stuttgart and Frankfort, in times of peace centers for the motor industry, but now undoubtedly busily engaged on war work. In Saxony there are the chemical factories at Chemnitz, Leipzig and Freiberg. If we are minded to revenge Louvain, Rheims, etc., there are such ancient art cities as Munich, or the mediæval town of Nuremberg.

As for Austro-Hungary, all the portions that are of any industrial or military importance are within reach of aircraft from the Italian frontier. The two capitals, Vienna and Budapest, are situated at a distance of only approximately half of the 500 miles radius, and therefore could, and we think, should, be given a taste of their own pet form of frightfulness. The industrial centers of Austria are not so very far from the Italian front, being chiefly spread around the eastern slope of the Alps and in the country between the Alps and the right bank of the Danube. In Bohemia we have the Skoda works at Pilsen, which are, of course, the Krupps of Austria. Again, in Austro-Hungary the governments have spent millions of pounds on the canalization of the rivers, which have been rendered navigable to an astonishing extent.—*Aviation*, 15/10.

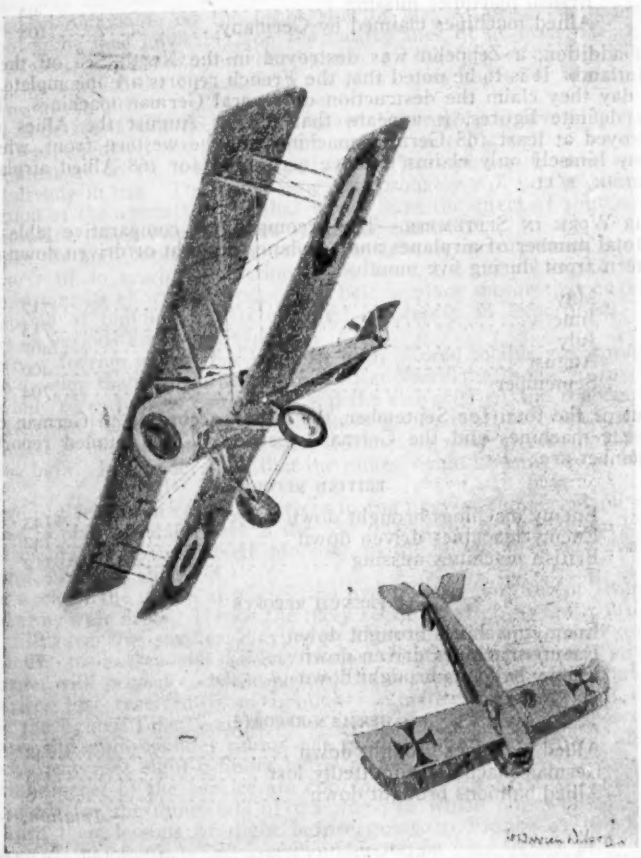
FRENCH AVIATORS IN ACTION.—Concerning an attack upon the German lines a dispatch from the French front said, in part:

"The French aviation service is greatly praised for its work. During the attack it rendered immense service for the French commander, working under the most unfavorable conditions for flying, namely, mists, heavy clouds and strong winds. The airmen flew over the infantry when they were making the attack, and when they saw the German infantry assembling for a counter-attack they advanced toward the enemy at an altitude of less than 100 yards, showered machine-gun bullets upon him and brought about a dispersal of the assemblage.

"Several French machines flew over the Laon railroad depot and attacked arriving troops trains. Some of the machines accompanying the infantry columns kept so low that they were obliged to shorten the antennæ of their wireless apparatus. All the airplanes participating in the battle were riddled with bullets. One of them fell blazing among the French troops."—*N. Y. Herald*, 25/10.

THE IMMELMANN TURN.—A favorite maneuver of enemy fighter airplanes is the so-called Immelmann Turn. This is in the main made use of when the German wants to out-maneuver an Allied aviator who has obtained a favorable position for attack behind and beneath the enemy's tail.

The Immelmann Turn consists essentially of three distinct phases: first, the *turnover,* in which the machine is pulled over onto its back by use of



Courtesy of *Flying* (London)

THE IMMELMANN TURN

full right or left aileron and opposite ruddering; second, the *nose dive,* and third, the *recovery,* which leaves the machine flying in exactly the opposite direction to its initial flight path. In doing the Immelmann Turn the pursuer invariably overshoots his mark and finds himself, at the completion of the maneuver, at a considerably higher altitude than his opponent. The accompanying illustration depicts the second phase of the Immelmann Turn.—*Aviation,* 1/10.

AIRCRAFT LOSSES IN AUGUST.—The following are the official figures relative to aircraft losses in August:

German machines destroyed by British	129
German machines driven down by British	104
German machines destroyed by French	60
German machines driven down by French	22
German machines destroyed by Belgians	8
British machines missing	94
Allied machines claimed by Germany	168

In addition, a Zeppelin was destroyed in the North Sea off the coast of Jutland. It is to be noted that the French reports are incomplete, as on one day they claim the destruction of several German machines. Taking only definite figures, it appears that during August the Allies wholly destroyed at least 198 German machines on the western front, while the enemy himself only claims to have accounted for 168 Allied airplanes.—*Aviation*, 1/11.

AIR WORK IN SEPTEMBER.—The accompanying comparative table shows the total number of airplanes and seaplanes brought or driven down on the western front during five months:

May	717
June	713
July	467
August	400
September	704

Out of the total for September, the Allies, according to German claims, lost 242 machines and the Germans lost 462. The detailed reports for September are:

BRITISH REPORTS

Enemy machines brought down	143
Enemy machines driven down	142
British machines missing	112

FRENCH REPORTS

Enemy machines brought down	91
Enemy machines driven down	79
Enemy balloons brought down	3

GERMAN REPORTS

Allied machines brought down	242
German machines admittedly lost	3
Allied balloons brought down	8

—*Aviation*, 1/11.

NAVAL AEROPLANES.—The Navy Department took under consideration October 23, the offer of a foreign airplane motor that in recent tests abroad is said to have developed 100 horsepower more than the larger of the two types of the Liberty motor. It has aroused the interest of naval engineering experts, who are working as hard to-day as they were before the Liberty motor was perfected, toward the development of airplane engines peculiarly suited to their service.

A report has also been received by the department from its representatives in London, based on information they have recently obtained as to the latest aeroplane construction by the allied governments, which indicates that Great Britain, and possibly France, is preparing to put into the air a fleet of new battle planes of greater size than any that have been employed thus far in the war. The inference is that a new motor of great power

has been developed that makes possible another stride forward in the employment of monster aerial dreadnoughts.

According to these London recommendations, the United States is advised not to use in any of the battle planes that we are at present engaged in building, motors of less than 300 horsepower, which is the power of the Liberty-twelve.

There is no indication that the Navy Department regards these reports as in any way disquieting, although they show that, according to the latest information obtainable on the other side of the Atlantic, the minimum horsepower deemed advisable for the battleplanes of at least one of the allied powers is the maximum horsepower of the largest of the Liberty motors, upon which the United States is pinning its hopes for victory over Germany in the air.

It is understood that the aircraft board has reported adversely to the Navy Department on the new foreign motor, which is said to be a new development of an engine of more than 400 horsepower from a smaller motor already in use. The navy, however, probably will not be bound by any action of the aircraft board that would have the effect of shutting out any aeroplane motor offered, from whatever source.

Despite the high hopes entertained of the Liberty motor, which has been the source of so much satisfaction in its tests, the navy has not abated for an instant its efforts to produce the best airplane motor that engineers are capable of building. It is engaged constantly in experiments with motors of various kinds and types.

The new foreign motor that has just been offered to this government is said to develop the greatest horsepower of any airplane motor so far built. It has only recently been completed, and the character of the reports as to its capacity will probably result in the navy giving it a trial with a view to adopting it if it should prove to have advantages over motors now in use or being built. It is understood that the motor could be built in the United States.

There is a feeling in certain quarters in the navy as the aeroplane seems destined to play so vital a part in the war during the next year the United States should not commit itself too soon to the adoption of any one type of motor, however excellent.

The work of the navy's airplanes and hydroplanes is different from that of the army's air fleets. Hence the navy recently, after careful consideration, discarded the smaller 8-cylinder Liberty motor, in favor of the 12-cylinder 300-horsepower Liberty motor, of greater power and strength a decision with respect to battle planes, the wisdom of which is confirmed by advices just received from London. Whether the army will decide to use the lighter Liberty-eight is an interesting question. For scouting purposes the eight-cylinder motor has proved successful abroad, and the French Army uses eight-cylinder battle planes.

Both branches of the service are confronted by the need of a perfected light motor for the thousands of trainings, in which our winged legions will learn their lessons of flight before going to France as full-fledged warriors of the clouds. The four-cylinder motor used by the army in the training planes causes such excessive vibration that the light airplanes are literally shaken to pieces, a serious matter when the business of aeroplane construction is already so acute. A more nearly perfect motor for these planes would solve another problem, upon which the navy engineers are also working, assisted by some of the leading commercial engineers in the country.

There are indications of increasing friction between the Navy Department and the aircraft board and a disposition on the part of the former to work along its own lines independently and unhampered by any outside bodies hastily organized as a part of the war emergency measures. The navy knows precisely what its own needs are, and although it has an open mind with respect to outside suggestions, it has shown so far a disinclina-

tion to be influenced by anything except actual and practical results. If a foreign airplane motor developing in excess of 400 horsepower has been produced that is suitable for American battleplanes, it will get a hearing on this side of the Atlantic.

The importance of the airplane in modern land and water warfare is regarded as being too great for anything to be ignored or anything to be taken for granted without actual demonstration.—*Washington Post*, 24/10.

A GERMAN APPRECIATION OF ENEMY AIRCRAFT.—A number of French and British aeroplanes which have fallen into German hands have been exhibited at the Berlin Zoological Gardens. The exhibition contained 31 machines, most of them complete, but a few with the motors removed. Of these 15 were British, 15 French, and one Russian. There were also exhibited a number of engines, some more or less damaged. Three of the machines were hydroaeroplanes.

Nine of the machines were single-seaters and 22 double. Five were monoplanes and 26 biplanes. Nine had stationary motors and 13 revolving ones, while two had two motors each. In seven machines the engine was behind the pilot, and in 22 in front, while in two it was at the side. Among the makers represented were the Franco-British Aviation Company (1 machine); Deperdussin (1); Nieuport (5); Morane-Saulnier (3); Farman Bros. (1); Caudron (2); Voisin (1); Blériot (1); Ferner Vickers (2); Martinsyde (1); Sopwith (1); and Avro (1), with six of the British Experimental Co. and four of the Fighting Experimental Co.

The general comment made on these machines in an article in the *Zeitschrift des Vereines deutscher Ingenieure* is that they are not nearly as well finished as the German machines, nor so comfortable for the pilot, and the arrangement of the levers and instruments is criticized as unpractical. It is admitted that the short life of the machines may be a justification for not spending too much time on their finish; on the other hand, it is argued that the permission for poor finish may be an inducement to pay insufficient attention to the vital parts of the machine. Surprise is expressed that the Allies are still building machines with the engine behind the pilot, although the utility of such machines is admitted as giving a free field for vision for navigation as well as for the use of the machine gun.—*The Journal of the American Society of Mechanical Engineers*, November.

PERSONNEL

LIEUTENANT MARCUS'S DEED PRAISED.—The official report of the investigation of the explosion on the submarine *A-7* at Manila last July, which resulted in the death of her commander, Lieutenant Arnold Marcus of San Francisco, and several men, praises the conduct of Lieutenant Marcus in the highest terms.

Secretary Daniels, in a letter transmitting the report to the officer's widow, concurs with the official board's report that Lieutenant Marcus, by his gallant conduct when he was dying, upheld "the best traditions of the service."

The official investigation disclosed that after the explosion, caused by the ignition of gasoline vapor by an electric switch, Lieutenant Marcus sent all of his men out of the hold before leaving himself; went to the bridge while suffering from burns which killed him, and personally took the helm with the idea of saving his ship by beaching her. When rescue ships took off the crew, Lieutenant Marcus refused to leave and asked that he be disregarded.

"It was shown from the evidence brought before the board," Secretary Daniels wrote, "that the conduct of your husband was that of a most gallant officer, who, although fatally injured, without regard to self, de-

voted every action and thought to the care of his vessel and men."—*N. Y. Times*, 16/10.

PRECEDENCE OF ENSIGNS OF NAVAL RESERVES.—There being no statutory provision covering the question of the precedence with relation to each other of the commissioned warrant officers of the regular navy and ensigns of the United States Naval Reserve Force, and it having been held by the attorney general that the Secretary of the Navy may determine such a question by virtue of his general authority under the President to make rules and regulations for the government of the navy, it is held by the Navy Department that the rank and precedence of the officers hereinafter set forth are as indicated, viz.:

1. Ensign, U. S. Navy.
2. Commissioned warrant officer, U. S. Navy.
3. Ensign, U. S. Naval Reserve Force.
4. Commissioned warrant officer, U. S. Naval Reserve Force.—*Army and Navy Register*, 27/10.

SUCCESSION TO NAVAL COMMAND.—The Secretary of War has ruled that naval officers designated for permanent engineering duty are not available for succession to command afloat or to the duties of executive officer in the absence of the executive officer and other intervening officers.—*Army and Navy Register*, 27/10.

NAVY TO MAN ALL TRANSPORTS.—It has been announced the United States Navy will, in the future, man all transports used by the government, the Shipping Board providing the crews for the cargo boats. Decision to have the navy operate the transports is believed to have been hastened by the sinking of the *Antilles*, manned by civilians. It is thought that a disciplined naval force is more effective than a constantly changing civilian personnel. This is regarded as particularly true of the stokehole force. The manning of the transports will make necessary a larger increase in the naval personnel and the General Board is understood to have recommended that Congress be asked in December to authorize an additional 80,000 men, 30,000 for the permanent naval forces and 50,000 for the period of the war. The navy has been training men especially for the transport service and a large force is understood to be available now. Others will be trained as rapidly as possible, so that not only all existing transports can be manned, but also the new ones now building. These latter have been especially designed and will be much faster than the standard cargo vessels. They are planned for a speed of at least 18 knots. The manning of the transports by bluejackets will release men for the cargo vessels operated by the Shipping Board.—*Shipping*, 3/11.

CONGRESS TO BE ASKED FOR INCREASE IN PERSONNEL.—The General Board of the Navy has recommended that the next Congress be asked to authorize a further increase of 80,000 in the enlisted strength of the navy, 50,000 to be temporary and 30,000 to be added to the permanent establishment. This additional personnel is required for duty in connection with the new destroyer program and for detail to the numerous auxiliaries being acquired for patrol and transport service. It will be recalled that Commander E. L. Bennett, U. S. Navy, Assistant Chief of the Bureau of Navigation, in his statement before the Committee on Naval Affairs of the House last August, expressed the opinion that a large increase in personnel would be necessary. A statement from the same officer to the effect that probably it would become necessary to man merchant ships with navy crews, in order to insure discipline at all times on board these craft, aroused much interest and no little criticism at that time. Later developments, however, bear out the wisdom of Commander Bennett's statement, and this is particularly true in the case of commercial vessels now being

operated under supervision of the Navy Department in connection with the transportation of supplies abroad.

Official reports have been received at the Department in answer to queries regarding the failure of transport convoys to maintain at least the speed of their slowest unit. These reports invariably place the blame upon civilians comprising the fire-room forces of the transports. It is stated that once the ships reach port the officers in charge have no authority over these men, many of whom celebrate the opportunity for shore liberty in a way that once was typical of the home-coming mariner. As a result, when the vessel again puts to sea, a large proportion of her stokehold force is *hors de combat* for about 48 hours. This situation is reflected in the speed of the vessel, many of those rated at 12 to 14 knots seldom turning up more than eight for the first two days out of port. That this slow speed is an element of real danger can be readily perceived. Navy officers who have charge of the transport service are prepared to recommend that all such ships be manned entirely by naval personnel in order that the same strict regulations may be enforced as in the case of a battleship.

Army Officers Control Ports.—The question of which department, war or navy, holds jurisdiction over transports while these ships are in port has been made the subject of several conferences. No announcement has been made, but there is authority for the statement that the army officer in charge of the port will have control of all transports from the moment they officially enter until they have been formally "cleared." The entire transport service passing through New York harbor, for example, under this decision will be in charge of Major General David C. Shanks, N. A. The Quartermaster Corps will assume the responsibility of furnishing subsistence for the crews—except, of course, members of the armed guards who remain at all times under the control of the Navy Department.—*Army and Navy Journal, 27/10.*

DESTROYERS DON WINTER GARB.—All American destroyers and men are now prepared for the winter. Both have been equipped for the cold days ahead. The issue of winter clothing to the men has taken place, and the fast little ships have been thoroughly overhauled and have had several "gadgets" added to their equipment such as gunshields for the men operating the guns, non-breakable glass windows for the bridges, more crows' nests and extra life rafts.

Thanks to the busy women at home who knit, many of the men have been provided with excellent sweaters, jerseys and socks. Now, however, an entirely new issue of extra heavy garments, designed by the British from their long experience on torpedo-boats in the terrible weather off this coast, has been made. Here are some of the things which, when donned, will make the men look more like Arctic explorers than bluejackets:

Helmets made of wool and covering all but the eyes, nose and mouth; light coat sweaters, jerseys and cardigan jackets, knitted mittens and gloves; extra heavy, coarse underclothing; light-knitted stockings, besides heavy, thick woolen socks for boots; leather sea boots, windproof khaki-colored trousers, greatcoats lined with lamb's wool and knitted mufflers.

Over this clothing officers and men will continue to wear their kapok life-jackets, made in vest form. These vests, in addition to their lifesaving properties, are very warm. Pillows and mattresses on board the ships are made of the same material. The men also had oil-skins when they came over.

The men face the coming hardships cheerfully. All they ask is that the folks back home do not forget them while they are facing the perils of fighting the submarine under the trying conditions of winter. Few have cruised in the gales that are peculiar to this coast, when sleet squalls are hourly affairs.

As to whether the winter aids or hinders the U-boats is a matter of divided opinion among those in the British service who have had the

experience of three winters. It is said a comparison of the figures will show there is not a great deal of difference in shipping losses between the summer and winter.

But this winter there are new factors in favor of the anti-submarine forces. The most important is the addition of the American ships. Next is the all-around increase in effectiveness of the methods for dealing with the submarine problem.—*Army and Navy Register, 22/10.*

A SERVICE INSURANCE LESSON.—The sinking of the American transport *Antilles* by a German submarine, with the loss of 67 lives, has furnished a striking object lesson in the benefits of the compensation and automatic insurance provisions of the new soldiers' and sailors' insurance law, says a statement issued by the Treasury Department. Following receipt of news of the disaster, Secretary McAdoo authorized announcement that the families of the men who lost their lives or were disabled in the naval or military service of the United States when the ship was sunk will immediately begin to receive compensation under the automatic provisions of the law, regardless of the fact that they had not signed applications for insurance policies.

William C. De Lanoy, Director of the War Insurance Bureau of the Treasury Department, in explaining the status of those lost on the *Antilles* points out that owing to the automatic insurance provision in the law, $25 a month insurance will be paid to a widow, for example, for 240 months in addition to the compensation of $25 a month, or a total of $50 a month. Were it not for the automatic insurance provision she would get only $25 a month. The money to pay both compensation and insurance is expected to come in large measure from the sale of bonds of the second Liberty Loan. In view of the importance of the new law to those in military and naval service and their families and dependents, the following official summary covering various cases was prepared by Director De Lanoy immediately following notification of the loss of the *Antilles:*

Compensation is payable for death or disability resulting from personal injury suffered in line of duty. It is paid by the United States without contribution from the person protected. The only persons entitled to receive compensation in case of death are the widow, children, and dependent widowed mother of the deceased. The monthly sums payable in each case are stated and are not based upon the pay of the deceased:

(a) For a widow alone, $25; (b) for a widow and one child, $35; (c) for a widow and two children, $47.50, with $5 for each additional child up to two; (d) if there be no widow, then for one child, $20; (e) for two children, $30; (f) for three children $40, with $5 for each additional child up to two; (g) for a widowed mother, $20. The amount payable under this subdivision shall not be greater than a sum which, when added to the total amount payable to the widow and children, does not exceed $75.

Compensation to a widow or widowed mother shall continue until death or remarriage. Compensation to a child shall cease at the age of 18, or at marriage, unless the child is incompetent. The United States shall pay burial expenses not to exceed $100.

During the continuance of total disability, monthly compensation shall be paid to the injured person. The amounts payable monthly are stated in this section; they are not based upon the pay of the injured person:

(a) If he has neither wife nor child living, $30; (b) if he has a wife but no child living, $45; (c) if he has a wife and one child living, $55; (d) if he has a wife and two children living, $65; (e) if he has a wife and three or more children living, $75; (f) if he has no wife but one child living, $40, with $10 for each additional child up to two; (g) if he has a widowed mother dependent upon him for support then, in addition to the above amounts, $10.

To an injured person who is totally disabled and in addition so helpless as to be in constant need of a nurse or attendant, such additional sum

shall be paid, but not exceeding $20 per month, as the director may deem reasonable. For certain specified conditions, or if the injured person is permanently bed-ridden, $100 monthly compensation is provided. (But no allowance for a nurse shall be made.)

The amount of compensation in case of partial disability is a percentage of the compensation provided in case of total disability. The percentage is equal to reduction in earning capacity resulting from similar injuries in civil life. Attention is called to the very important provision of Section 303, that the United States shall furnish medical, surgical and hospital services and supplies, in addition to pecuniary compensation.

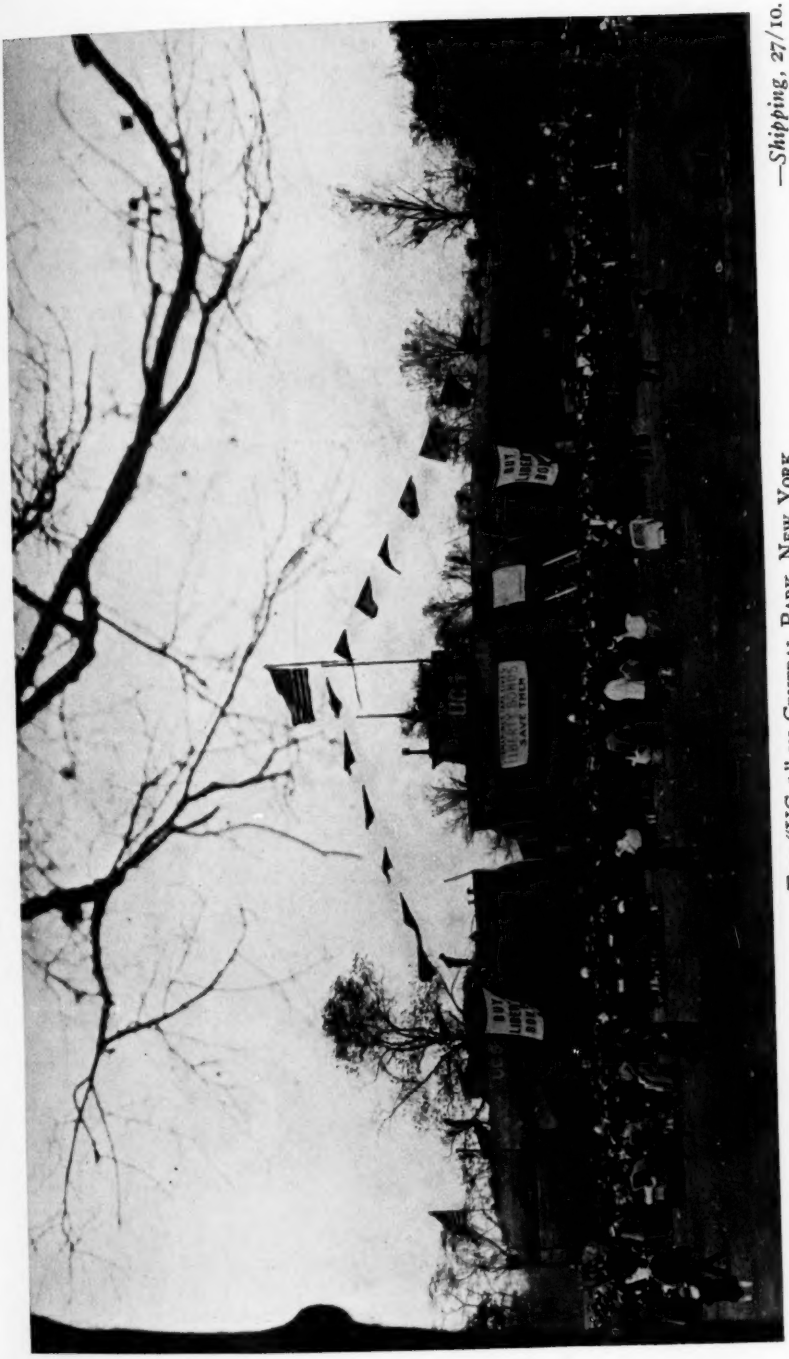
The men and their dependents are also protected by the automatic insurance granted in Section 401, as follows: Any person in active service on or after April 6, 1917, is insured automatically until February 12, 1918, unless he has applied for insurance to take effect at an earlier date. The protection thus given is against death and against total permanent disability occurring while in active service from April 6, 1917, to February 12, 1918, inclusive.

If the insured person die without having become so disabled during the period stated, monthly instalments of $25 each will be paid his wife, child, or widowed mother. These instalments are payable to the wife during her widowhood or to the child or widowed mother while they survive him, but not more than 240 instalments shall be so paid. If the insured person becomes totally and permanently disabled during the period stated he will receive an income payable in monthly instalments of $25 each during disability. If he die, like instalments are payable to the wife during her widowhood or to the child or widowed mother while they survive him, but not more than 240 instalments, less the number of instalments that may have been paid to the insured while disabled, shall be so paid.

Every man in active service has the opportunity of buying $10,000 insurance at extremely low rates. He or his family would get $57.50 a month for that amount of insurance.—*Army and Navy Journal*, 27/10.

SUBMARINES

COPING WITH THE ENEMY SUBMARINE.—No one actually knows what Germany has been doing in the way of new submarine design and construction, but the conservative naval estimate of that phase of the situation does not credit Germany with the possession of more than 100 submarines, available for active service, and of these it is safe to say that one-half are held up for repairs and overhauling or are in transit to and from stations, most of them naturally being in British waters and in the Mediterranean. Neither do naval officers feel that the Germans have made much advance in the type, either as to speed or displacement, despite interesting rumors to the contrary. One important condition now prevailing that discounts a great deal claimed for German ingenuity and enterprise in this particular and this is the known difficulty that is being encountered by the Germans in obtaining some of the materials necessary in the submarine construction, especially copper, that has been coming mostly from South American sources. Vessels engaged in the export trade must now be licensed when sailing from a domestic port and a neutral ship that comes from a South American port with materials that may be destined for Germany and that calls at a United States port for fuel will have to obtain two licenses, one for the cargo and the other for the supply of bunker coal. This is a phase that has been generally overlooked for its appreciable influence upon German effectiveness. The embargo becomes at once an exceedingly important factor in bringing the enemy to terms that do not contemplate a German peace. This attack by means of the embargo is destined to be more productive of the desired results than sending a naval expedition into the German submarine bases, which are formidably defended against any such invasion. Most observers identify such a proceeding as suicidal with



THE "UC-5" IN CENTRAL PARK, NEW YORK

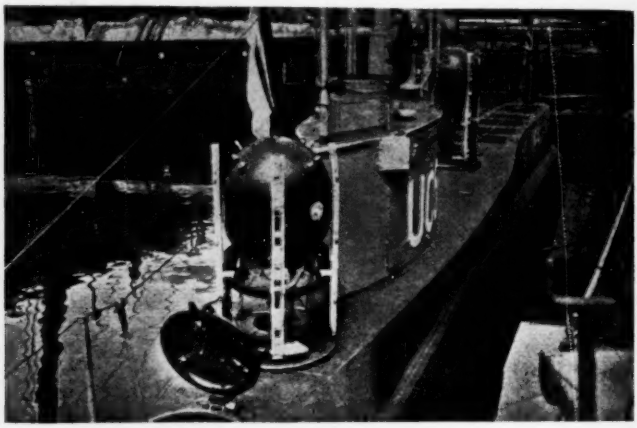
—*Shipping*, 27/10.

the advantages, if any were obtained, at too high a price.—*Army and Navy Register*, 20/10.

ADDED PROTECTION AGAINST SUBMARINES.—Added protection against the piratical submarine is assured American lives and property by the construction of vessels of a design recently completed by Washington L. Capps, chief constructor of the navy. The vessels will be built with reinforced bulkheads, and, while they will not be unsinkable, they will remain afloat, if torpedoed, long enough for all on board to take to the boats.

American genius devised the submarine, and ever since that engine of warfare became a menace to world commerce American genius has been trying to devise a foil for that weapon.

The new design is not a marvel of mechanical genius. It is merely the result of sound, thorough shipbuilding knowledge applied to the exigencies of the present situation. It will involve added cost, but government officials do not reckon that an item to be considered when American lives are at stake.



MINE LAYING APPARATUS OF "UC-5"
—*Shipping*, 27/10.

"There is no such thing as an unsinkable ship," said an eminent marine engineer to-day, "but a ship can be built so that it will float long enough after being torpedoed to get every man into the boats."

The design for the new ships, it is understood, includes a reinforcement of the bulkheads which will be so constructed that no matter how severe the blow delivered by a torpedo the ship will not sink immediately. This construction will sacrifice some of the space in the hold and thereby reduce its carrying capacity, but officials of the Shipping Board consider that fact negligible as compared with the other features of the design.

The ships will have a speed of at least 16 knots, and the record of sinkings shows that only about 10 per cent of such ships have been sunk by submarines. The addition of the features heretofore referred to will make a ship that will represent the highest achievement in shipbuilding.—*N. Y. Herald*, 22/10.

MICROPHONES.—It is stated that the submarine listening microphones have been perfected to such a degree that all ships will soon be able to recognize the presence of a submarine, and its direction, and can then

maneuver so as to avoid it, while, on the other hand, the gunboats and scouting vessels can at the same time take up the pursuit.—*The Army and Navy Gazette*, 6/10.

THE DESTROYER, THE TRAWLER AND THE DEPTH BOMB.—The student will search the history of the development of naval warfare in vain to find a period in which the eternal struggle between attack and defence has developed so many and varied mechanical appliances or such rapidly changing strategy and tactics in the use of them, as have been manifested in the fight between surface and sub-surface ships in the present U-boat war.

Before the war, except in the minds of some of the more alert and imaginative among naval men, defence against submarine attack was confined mainly to the torpedo net—and very few of our officers had much faith in that. In fact, in the few years preceeding 1914, the experience gained in naval maneuvers had served to fill the minds of the naval men with very serious apprehensions as to what would happen to a battleship line, if a fleet of submarines should ever get near enough to make a concerted attack.

With the outbreak of the war, however, we began to learn very fast. The loss of the three armored cruisers, *Aboukir*, *Cressy* and *Hogue*, was a dearly purchased lesson which was at once given practical application. To loaf along at 8 to 10 knots on patrol, unconvoyed by destroyers, was seen to be nothing more or less than a policy of suicide; so was the approach of friendly ships of large size to render assistance to a stricken vessel. Slow speed and lack of a destroyer screen lost the first of these ships, and the stopping of the sister ships to rescue the crew inevitably sealed their doom. Forthwith, high steaming speed and the leaving of a torpedoed ship to its fate became the order of the day. A little later, the fact that 60 warships steaming at high speed and using the torpedo fought off and on for six hours in the Bight of Heligoland, without a single ship being struck, revealed the fact that high speed coupled with large helm area and quick turning ability were the best defences against the new sea terror.

And then the gun came into its own; so that even the slow freighter, provided it carried a piece which could outrange the enemy, was able to keep the U-boat outside of torpedo range and render it inexpedient indeed to engage in a gun duel at the surface. Then it came to be understood that if a way could be found to locate the submarine its capture or destruction would be certain; and so Great Britain gathered together in the waters around her coast that wonderful fleet of over 4000 small craft—motor boats, converted yachts, tugs and tenders—which in the first two years of the war did such Trojan work in hunting out and destroying the sea pirates. Ultimately into this strange contest there entered the seaplane, which proved itself to be an invaluable ally, not merely in detecting the enemy and bringing up the patrol fleet for its destruction, but also in direct attack by bomb dropping.

And thus it came about that the bays, roadsteads and more or less sheltered waters around the British Isles became too hot for the U-boat, so Germany set afloat much larger and more seaworthy craft, that swept out boldly on to the transatlantic routes and thereby largely minimized the efficiency of motor-boat patrol. For when it comes to deep-sea work, the patrol boats must be large and stout and altogether seaworthy, capable of carrying a fair-sized crew and enough provisions to enable them to keep the sea for a couple of weeks on end. And so it has come about that out of the miscellaneous craft which have been engaged in fighting the U-boat, the choice for deep-sea work has narrowed until it now lies between two types—the destroyer and the trawler.

The trawler has a positive contempt for the U-boat—a self-assurance which has grown out of three years' conflict with them under all possible

conditions. In the first place, the trawler is an excellent sea boat, stout in construction, broad of beam, with lofty bow and capable of taking everything that comes her way in the matter of wind and weather. Also her draft is so light that she has little fear of the torpedo, and she is stout enough to mount guns that can take care of anything the U-boat may carry. She is also very serviceable for the escorting of slow convoys, for salvaging vessels, for mine sweeping and for various other related duties.

The destroyer, of course, is the ideal anti-U-boat craft. It is big enough to stay at sea in all weathers. It carries an armament, in our navy, of several 4-inch guns; and with its speed of from 30 to 35 knots it can dash down upon a sighted submarine so swiftly as to put the enemy in immediate peril of penetration by gun fire, or of being sunk by the depth bomb.

There is just one device needed to enable the destroyer to rid the seas of the submarine pest in short order; for if someone will only produce a sound detector of sufficient range to enable a destroyer to find and follow a submarine when it is submerged, the thing would be done. For the submarine is primarily a surface vessel—in fact, it spends 90 per cent of its time on the surface. Its period of submergence in deep water is limited; and whenever a submarine that was under observation through listening devices came up, the destroyer would have it.

The Depth Bomb.—The depth bomb can be made in any size desired, and it is probable that the average type in use carries about 250 to 350 pounds of T. N. T., which is about the charge of the modern torpedo. The effectiveness of this instrument consists in the fact that it does not by any means have to hit the submarine to destroy it. Its destructiveness is based upon the fundamental fact that water is incompressible, and that the shock of detonating a mass of high explosive under water is felt immediately in all directions—the effect diminishing, of course, with the distance from the bomb. It was stated by Hudson Maxim that 4 cubic feet of T. N. T. at the moment of detonation produces 40,000 cubic feet of gas. Now, when a mine, or bomb, or torpedo warhead is detonated the expanding gases seek the line of least resistance. In the case of a torpedoed ship, this line leads into the hollow interior of the ship, the incompressible water forming an abutment in all other directions; but when a mine or depth bomb is detonated the line of least resistance is upward; and the gases cut their way quickly to the surface, carrying a fountain-like mass of water to a great height into the air. If the explosion takes place at a considerable depth, however, the resistance to the upper escape of the gases is greater and the shock transmitted through the water in all directions is proportionately increased. We illustrate this tendency; failing to blow up the surface of the ocean, the bomb must blow in the submarine.

The destructiveness of the bomb against the submarine will depend upon two things; first, the depth at which it is detonated, and second, the distance from the bomb to the submarine. Manifestly, then, it is advisable to detonate the bomb below the submarine as the shock transmitted will be proportionally greater than if it were above it, other things being equal. As to the distance at which an explosion would be absolutely destructive, rupturing the plating and sinking the submarine, Mr. Hudson Maxim writes us that if 500 pounds of T. N. T. were exploded deep under water within 125 feet of a deeply submerged submarine, it would completely destroy it. Smaller charges would, of course, have to be detonated proportionally closer to the submarine to secure destructive action.

Obviously it takes considerable skill to make a successful bomb attack of this character. On sighting the submarine the destroyer will make a dash for it at full speed, and estimating the depth and the course of the enemy, it will endeavor to drop a bomb so that it will either hit the submarine, or failing that, will be detonated below it and within crushing distance. The bomb, it is scarcely necessary to say, has an automatic means by which the depth at which the explosion takes place can be regulated—*Scientific American*, 27/10.

LESSONS OF THE WAR

COMMENTS.—When the government calls upon the people to subscribe their earnings to a national loan, it urges experienced bankers and financiers to throw the weight of their influence into the campaign to devise means that will insure the loan's success. In other words it occurs to no one that a financial operation can be carried out with success by any other than men versed in the handling of such affairs. But when it comes to the solution of shipping problems, an altogether different state of mind is in evidence and we have in fact the word of a special writer in the New York *Tribune* to the effect that men who have spent a lifetime in the building and operation of ships are not wanted to solve the tonnage question, for the reason that their minds run in a groove. What is wanted now is new men with new ideas. When one considers the freaks that have been perpetrated since the government began to take steps to remedy the shipping shortage, from green-timber ships to impossible composite vessels, one is forced to the conclusion that the public has indeed been given a surfeit of new ideas and that so new are some of the men appointed to shipping posts to the responsibilities cast upon them, that it is the fervent wish of all experienced men that no disaster overtake the country before those who have spent their lives in the shipping industry are called upon to do that which should have been their task at the very beginning.

By what freak of reasoning can it be thought by any one in his right senses that in order to do things it is necessary to call upon men who do not know the subject and are not even sufficiently experienced to appraise at its just value the advice of humbugs who happen to have forced their way into councils to which they never should have been admitted? When the war forced the nations opposing the modern Mongols to throw into the discard many cherished formulæ, it was not inexperienced men that thought out the new order of things, but experienced technicians driven by the force of circumstances to elaborate in a few weeks a régime differing totally from that in which they had been schooled and in which they had spent their formative years. Many of the men of the old regime were unable to adjust themselves to the new era and were mercilessly discarded. But it must never be overlooked that the engineers who devised the machine tools which now enable a woman worker to do a job which in former years could only be undertaken by skilled mechanics, were men who knew intimately every detail of the industry which they simplified at the call of their country so that the emergency could be met and the armies supplied with the explosive arguments necessary to curb the Hun.

Let the public not be deceived by catch words and phrases when it comes to the solution of puzzles which trained men cannot decipher. There is not in history a single example of an invention having in the course of a few months completely revolutionized the established order of things. The original telephone was a crude instrument that could not be depended upon for maintaining oral communication at all times and so were the original patterns of all devices which have in the course of time altered the material aspect of modern civilization. How fatuous then is the attitude of mind which expects wonderful inventions to issue forth out of the brain of dreamers, like Pallas Athene coming out fully armed from the head of Jupiter, which inventions are to end the U-boat peril and enable wooden transports built of green timber and fabricated ships thrown together overnight from sections fabricated in motor-car shops, to provision an army improvised in defiance of all accepted ideas of organized warfare? It has been submitted in good faith by some ultra-enthusiasts that such a procedure would be but a duplication of what was accomplished at the time of the French Revolution, when the young Republic faced Europe in arms and single-handed defeated the professional armies of one coalition after another.

If the French Republic succeeded in defeating professional armies with volunteer material, it was only because the armies opposing it were suffering from lack of discipline, while the republican generals had whole companies of soldiers shot for the slightest infraction of discipline, "just to encourage the others," as Voltaire said of Byng's execution. Unsuccessful generals were beheaded, not retired upon a pension, and merit found quick reward in promotion. The generals who had organized the French armies were trained men who had been passed by for promotion under the old régime, but whose talents exhibited themselves in a variety of ways, once given a fair chance. On the sea *per contra*, where the whole body of officers had emigrated *en masse*, the French were absolutely helpless against the British and did not win a single fleet action, for the reason that the officers who had been promoted from the lower deck knew nothing of the handling of ships in tactical groups. The naval history of the French Revolution ought to be impressed upon the minds of those who believe in the improvisation of war fleets and mercantile navies in times of stress, save through the co-operation of those who have from early youth been trained in some of the multifarious branches of human endeavor into which the sea calling is subdivided, from the design and construction of the ship to its commercial management, operation and navigation.

It is time yet to revise most of the radical doctrines which are likely to breed disaster unless they are thrown to the scrap heap where they belong and every one in good standing in the shipping industry is given a chance directly to be of service to the country along the lines which he understands best and which are also those likely to offer the least resistance in accomplishing the ideal that is now before the nation; namely, that of getting out the ships and operating them to the best advantage, before the Hun has had a chance to poison the minds of the peoples opposing him and leave Great Britain and the United States alone to fight the modern hydra. For the situation of the world to-day is nothing less than a fight to a finish between Anglo-Saxondom and all that it represents in the way of human liberty and freedom of effort to the individual on the one hand and Kaiserism on the other. Kaiserism stands for everything that the Anglo-Saxon mind intuitively abhors, such as complete subordination of the individual to the state and the extinction of every vestige of that sentiment which in the Dark Ages wrung the Magna Charta from a king and led a handful of colonists to defy the might of the strongest power of the time.

It is that very sentiment of individual freedom which places the Anglo-American entente at a disadvantage when fighting such human beasts as the Kaiser's uniformed thugs and murderers. Rosewater warfare was responsible for the military collapses which British prestige was compelled to suffer during the present war and who knows how much more blood will have to be spilt before both Great Britain and America understand the true nature of the hordes of degenerates against whom they are warring. The crass materialism which is now in evidence in the Kaiser's armies is the prime motive of all the atrocities committed by the Huns on sea and land and a direct result of years of state control during which every vestige of political liberty was denied the individual in exchange for the guarantee of a litter of straw and a bone to gnaw upon. This is the ideal that Socialists are holding out to-day to the people of this country and in the name of which they insidiously agitate for a peace favorable to the Central Powers. Against such a consummation it is necessary to mobilize every latent energy of the nation and particularly is it urgent at this time to enlist the services of those who have during a lifetime acquired intimate knowledge of the difficulties which must be surmounted in the accomplishment of a given task. The practical man may be unduly pessimistic. But the only help that the outside optimist can give is, by his cheerful attitude and willingness to dispense with non-essentials, lead him on toward the attainment of the desired goal who is aware of the difficulties of the task and is not likely to inject into the nation the soporific drug of over-confidence

at a time when every nerve must be strained to defeat the apocalyptic beasts in German uniforms that now ravage the world bent upon murder and the destruction of modern civilization.—*Shipping*, 3/11.

AMERICAN DOCTORS AND THE BRITISH ARMY.—A good deal of interest has been evinced in the announcement that the army council, taking advantage of the presence among us of a number of American military doctors who are part of the future expeditionary army of the United States, have delegated to them much of the medical work in our own military hospitals in order to release civilian doctors to minister to the civilian population. The move has so far not proved altogether popular. From the point of view of the civil practitioner a distinction must be made between those who are working only part time and those who are working whole time at the hospitals. It is contended by the latter that it is easy for the half-time men who have kept up their private practices to return to them altogether. The whole-time doctors indeed say: "We who early in the war surrendered everything in the country's interest and rallied to the government's call are now booted out at the briefest notice to make way for substitutes from abroad. We have to fend for ourselves, and don't get a 'thank you' for our pains." As we believe that there are in all only about 200 American medical officers in this country, the reinstatement of our own whole-time doctors might solve the problem. But for ourselves we are naturally more interested in the soldier than in the civil practitioner. As one correspondent writes: "No matter how compelling are the motives which have urged the military authorities to take this step, the fact remains that it will be a grevious disappointment to the average soldier, when he arrives at his home hospital, not to find himself in the familiar hands of an English doctor. He will know that his pal at the factory can get a doctor of his own nationality—for him there is no such luck. His grateful (?) country, for which he has suffered his grevious hurt, cannot find a way to provide him with such a luxury." As regards the preference of the British soldier for a British doctor, though probably true as a rule, it is certainly one of those instances when the individual means more than the nationality. Undeniably, when a soldier is sent home to get his last chance of life with a sound body, he should be given the best medical advice that can be furnished. And certainly the experience of the surgery of war which our own doctors have gained during the past three years should make them more capable than those who have hitherto had little or no practical acquaintance with this side of their profession. Possibly a fairly wide distribution of the American doctors among the hospitals of Great Britain would eliminate all danger of any man suffering from lack of more experienced advice. If a sufficient number of English doctors who have been attending wounded soldiers were left in each district, the less-experienced American surgeons would always be able at the shortest notice to avail themselves of a second, and English, opinion.—*United Service Gazette*, 27/9.

MISCELLANEOUS NOTES

SAVING TORPEDOED SHIPS.—It has been definitely established that many vessels have survived torpedo explosion. Some have sunk within a few minutes thereafter, whilst others have lasted many hours before foundering. The former obviously proves that bulkheads do, in many instances, properly confine the inrush of water, whilst the latter equally obviously proves that in other cases the bulkheads have been structurally inefficient to stop the inrush into compartments other than the ones holed, either by reason of damage due to the explosion or by being non-watertight under pressure originally. Those cases where vessels have sunk within a few minutes prove that the watertight subdivision of the vessels is useless against

torpedo attack, and hence does not enter as a factor in the present discussion, says the *Liverpool Journal of Commerce.*

Where vessels survive torpedo attack by several hours, the bulkheads bounding the flooded compartments are clearly leaking at a comparatively slow rate, possibly through slight structural damage which cannot be located, or which cannot be temporarily made tight. It is these cases that we are now considering. Whether they are frequent or infrequent does not affect the argument; if the latter, it may be that when a submarine finds her victim is not sinking fast enough, she either fires a second torpedo or tries to sink by gun fire. Sinking by gun fire should be impossible so long as the intended victim is armed with a respectable defensive gun which has not been put out of action by the explosion itself, whilst the possibility of being sunk by a second torpedo should be rendered small with a thoroughly efficient patrol system.

It has been fairly well established that vessels have remained afloat for periods varying from half an hour to 12 hours after suffering the damage resulting from torpedo explosion. Obviously the compartment or compartments directly in wake of the damage are instantly opened to the sea, so that the reserve of buoyancy contained therein is immediately destroyed; therefore the remaining reserve requires from half an hour to 12 hours to be overcome. Take the case of an average ship of about 350 feet by 45 feet by 22 feet mean draft with a block coefficient of .78. The displacement of such a vessel at the above draft, which represents the loaded condition, is about 7700 tons. Assume a reserve of buoyancy of, say, 60 per cent, and we get 4620 tons as the quantity of water which must enter in order to sink her. This is mostly provided by four holds and a machinery space in the average case, and making a further assumption that they are roughly equal, each compartment provides a reserve of buoyancy of about 900 tons.

When the vessel is torpedoed, certainly one, and very probably two, such compartments will be opened up to the sea instantaneously; it is proposed to consider the case where only two compartments are opened up, as the assumption of a third bilged space would be very much in favor of the argument now being advanced. Thus we are left with about 2700 tons reserve of buoyancy which must be destroyed by leakage past the bulkheads before the vessel will sink. If this is destroyed in half an hour, then the rate of leakage is 5400 tons per hour, whilst if the vessel survives for 12 hours, the rate of leakage is a little over 200 tons per hour. This, of course, excludes those cases (which are doubtless by no means negligible) where a vessel eventually founders owing to water finding its way inboard through large deck openings on account of the damage causing excessive list or trim; this, however, forms the subject of an entirely different question which, it is presumed, has not been lost sight of by those in authority.

Now a rate of inflow of 200 tons per hour would correspond to the leakage through a 4-inch or 5-inch diameter hole 16 feet below the water level; this is approximately the diameter of the average bilge suction in a merchant vessel, so it can be seen that an open-ended pipe through a bulkhead can account for the foundering of a vessel in 12 hours which would otherwise remain afloat. The rate of 5000 tons per hour is consistent with an opening in a bulkhead of about 3½ square feet 16 feet below water level, and, therefore, almost certainly is caused by structural damage to the bulkhead itself.

The ordinary bilge pump of a vessel, even if in working order after a torpedo explosion, could not cope with an inflow of water into a compartment of 200 tons per hour, although it could render the time of remaining afloat appreciably longer. There are, however, many excellent pumps manufactured which can easily deal with this quantity. Even a small 4-inch motor pump could deal with about one-half this quantity, whilst a 6-inch pump could probably keep pace with the rate of inflow after the water in the compartment in question had reached a certain relatively low level.

If a large pump were installed in conjunction with a small one of the nature mentioned, it would not be difficult to deal with a rate of 1000 tons per hour. The important thing, of course, is to ensure, if possible, that the pumps are effective after the explosion, and although this cannot be rendered certain, they should be reasonably safe in many cases if installed on the upper or main deck somewhere slightly forward of amidships, with the suctions already rigged to the various holds. Another important point to remember nowadays is that not only will the ordinary bilge suctions usually be quite insufficient to deal with a fair-sized leakage past a bulkhead even if they remain in working order, but they themselves may quite probably provide a passage for the water unless they are fitted with valves at the bulkheads, which is not usual practice.

Obviously the pumping plant necessary to deal with an inflow of 5400 tons per hour is such as to render its installation in an ordinary ship prohibitive. This rate would be caused by the comparatively small opening of 3½ square feet low down in a bulkhead, so it seems clear that only in those cases where the structural damage is quite small can leakage into an adjacent compartment be overcome or stopped.

From the foregoing it seems very probable that some vessels may have been lost owing to leakage through pipes passing through the bulkheads, and thus these fittings are really a source of danger rather than otherwise. If the holes were blanked up, then, should the explosion not seriously damage the bulkheads, there is every prospect of saving the vessel; whilst, if a small and efficient pumping plant be installed (separate from the machinery spaces themselves) leakage caused by holes up to probably 7 inches or 8 inches in diameter could be kept under. Even a hole corresponding to 12 inches in diameter would only admit a certain relatively small quantity of water before the pumps in question could deal with the inflow.

Very possibly, in some older vessels, leakage past bulkheads unable to hold up to the head of water caused by a bilged compartment, has itself caused foundering, and here again the installation of a small pumping plant, as suggested, would be the means of saving them. In any case, it may be accepted as a fact that the ship's ordinary pumps are useless; their suctions are a source of danger rather than otherwise and had much better be blanked up; one or two small motor pumps suitably installed would often be the means of bringing a vessel into port, or of enabling her to be beached with a reasonable probability of being salved.—*Shipping*, 10/11.

NATIONAL RESEARCH COUNCIL

DR. MILLIKAN'S LETTER

Edited for publication

September 7, 1917.

Dr. Cary T. Hutchinson, Secretary,
The Engineering Foundation,
33 West 39th Street, New York.

DEAR DR. HUTCHINSON.—The following is a statement of some of the work of the National Research Council, condensed with difficulty on account of the great variety and scope of the council's activities.

All of the work of the Research Council that touches upon army or navy problems is carried on with the advice, cooperation or control, as the case may be, of the representatives of the various departments of the army or navy under which such work comes.

The council has cooperated in the establishment and organization of the submarine experimental work at Nahant and has also established a very active submarine station at New London, another at San Pedro, California, and has been instrumental in the organization of groups working at New York, Chicago and Madison, Wisconsin.

There has resulted a great practical advance in the art of submarine detection which it is not desirable to go into further.

The physics committee of the council has distributed to various groups 20 or more large problems in physics, which are being actively worked upon and some of which have already been solved. Among the latter are the location of aircraft by sound, the development of fire control for anti-aircraft guns, telephoning between airplanes, protection of balloons from ignition by static charges and the development of new and improved methods of measuring muzzle velocities.

The chief officer of the signal corps of the army has asked the Research Council to act as the division of science and research of the signal corps, and in this capacity the council has organized a sound-ranging service in the signal corps, a new meteorological service in the signal corps, and is now drawing specifications for scientific instruments to be used on airplanes. It has sent a dozen of the best physicists in the country to France to aid the American expeditionary forces with their scientific knowledge and is selecting a personnel of several hundred men who are to be engaged in the scientific services of the army and navy.

The chemistry committee has perfected an elaborate organization for the handling of all the chemical problems which arise in the army and in the navy, and it has distributed some 150 chemical problems which are being attacked in the chemical laboratories of the country.

The psychology committee has presented to the Secretary of War and the Adjutant General a vast program for the selection of officers for the army from officers' reserve camps and for the classification of drafted men. In fact it has called in most of the best-known psychologists of the country and has organized them and employment experts into a large group in whose hands the War Department has placed the largest responsibilities regarding the examination and selection of men.

The medical committee has enlisted the services of a large number of medical men of the country both in medical research problems and in the regular work of the sanitary corps of the army.

The engineering committee has contributed in no small degree to the development of devices for the protection of ships from submarines. It has organized a large group which are now working on the development of steel protective devices for use of the soldiers at the front, and through cooperation with the National Advisory Committee for Aeronautics it has carried on extensive and important researches in the development of airplanes and airplane engines.

Turning to the work of the special committees of the council, the nitrate committee has made an elaborate study and report which has been made the basis for the expenditure by the government of large sums of money upon the erection of a nitrate plant.

The gas-warfare committee has had for six months 120 chemists working on the problems of gas warfare and the results already attained have been of the utmost importance—so important that the army and navy have placed large appropriations at the disposal of this committee for its researches.

The optical-glass committee, by taking from the research laboratories like the Geophysical Laboratory and the Bureau of Standards, a dozen more silicate chemists and putting them directly in the works of the Bausch and Lomb Company and the Pittsburgh Plate Glass Company, has in six months' time developed in America the production of optical glass from nothing up to 20,000 pounds a month and in two months more this figure will have been multiplied two or threefold.

The psychiatry committee has established abroad a laboratory for the study of shell shock.

The foreign service committee, which the council sent aboard at once upon the outbreak of the war, was wholly responsible for the sending back to this country of a French, English and Italian scientific mission, which brought with them the contributions which science had made to the war, both in the matter of instruments and methods, and unquestionably saved

months of time in putting the United States abreast of the European situation, as regards modern scientific methods in warfare. It is difficult to overestimate the stimulus to American participation in the war which resulted directly from the action of the Research Council in sending abroad at once this foreign-service committee composed of seven of the best scientists in the country.

These are a few of the results which have followed from the assistance which the Engineering Foundation gave in the bringing into being of the National Research Council. It is hoped that they are only a small part of the results which will have been attained by the end of the second year of its existence.

Sincerely yours,
(Signed) R. A. MILLIKAN,
Vice-Chairman.

—*Proceedings of the American Institute of Electrical Engineers, November.*

RADIO-CONTROLLED SHIP.—John Hays Hammond, Jr., whose wireless-controlled boat is being developed with the assistance of the government expressed the opinion that the recent attack on British patrol ships off the Belgian coast by an apparently similar device was in the nature of an experiment by the Germans and the beginning of more serious attempts on their part to use shore-controlled craft against the enemy. From the meagre details of the attack contained in London dispatches, he said, it was impossible to judge whether the German craft was operated by cable or by radio.

"Reports from London concerning the attack on the British patrol by an electrically controlled torpedo indicate," Mr. Hammond said, "that the Germans are to-day proceeding more seriously on the crude development which I witnessed a few years ago near Berlin.

"From the report of the manner in which the attack was carried out, I believe that this development has by no means progressed as far as that of our own. The tactical mistake of endeavoring to attack a group of warships with one surface torpedo in the daytime is as ridiculous as would be an attempt to carry out a torpedo attack by a single torpedo boat against a squadron of capital ships. It is evident, therefore, that the reported attempt was some form of experimental trial, and it is very probable that it is only a precursor to future attacks where the controlled torpedoes will be operated simultaneously in large numbers."—*N. Y. Times, 6/11.*

THE NEW WAR TRUCK. BY C. H. HARDY.—If competition is the life of trade, co-operation may be the soul of progress. At least, the new war truck, as the Quartermaster Department calls the Type B truck evolved for its use by the Society of Automotive Engineers, the leading engine, chassis, transmission, rear-axle and parts designers of the country, with the active co-operation and supervision of General Chauncy B. Baker, Q. M. C., and the Automotive Products Section of the Council of National Defence, appears to demonstrate this fact.

There seems no doubt that this truck begins a new era in motor transportation. It may not be the "ultimate truck" but it represents so advanced a practice, so many ideas of so many makers which were being either worked out for the future or, already perfected, being held for future production of commercial engines and cars, that it can hardly be considered as less than revolutionary.

The story of its design is as simple as it is inspiring. High-salaried representatives of the leading automobile, engine and parts manufacturing companies were called together by the Society of Automotive Engineers, told one story and asked one question.

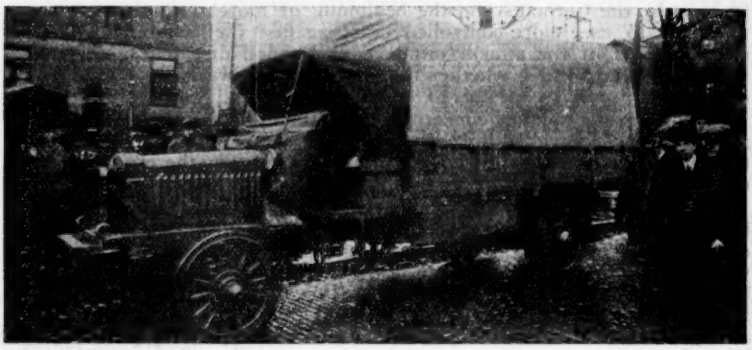
"The success of modern war depends on no one factor more than upon successful, speedy, economical and certain transportation of supplies.

Other things being even approximately equal, the army with the best transportation wins."

That was the story. Follows the question:

"You gentlemen, together, know more about trucks, engines, and parts than the rest of the world put together. Are you willing to sink personal pride and prejudice, are you willing to forget trade and money making, are you willing to pool your knowledge and make for the government a standardized truck which will be to all other trucks as the racing car of to-day is to the racing car of 10 years ago?"

"Very simple," was the answer. It was a universal assent, followed by conference after conference, design after design, labor after labor. Engineers who had not done more in detail than think and direct for years, bent over drawing boards, cross-hatching. Designers who had hitherto guarded the secrets of their plans with locked doors and trusted employees talked freely to their competitors. One engine maker who had designed a combustion chamber, tested it and perfected it and found it something ahead of all others and who was planning to use it on 1919 or 1920 cars handed it over without a thought. Every man with a pet oiling system brought it to conference and puzzled over the fact that the others were as



THE NEW "LIBERTY" TRUCK SPECIALLY DESIGNED FOR THE U. S. ARMY

successful as his, whether it worked at 100 or 50 or 20 or 2 pounds pressure, until experiment and calculation showed that all were successful because all were passing the same amount of oil per revolution regardless of pressure. Rear-axle men forgot the rival claims of their respective companies, freely admitting the other fellow's good points, and together produced a rear system which combined the best of all. Lubrication, ignition, governing, transmission, cooling, springs, weight distribution—all received the attention of the men who made the best in the world, and were designed, not by one, but by the cream of the profession, acting in concert, without pay, without hope of reward, without any thought save that Uncle Sam needed a real truck, and that it was not their patriotic duty, but their patriotic pleasure to give him all they had.

Result, the war truck. After January 1, no other Type B truck will be supplied our army. In a short time—a shorter time than European experts believe a manufacturing possibility—the whole army will be supplied with this one type of truck.

What this means, even were the truck just an ordinary vehicle, only those who have worked out transportation problems at the front may know. In Paris a huge 12-story building, filled with card systems and hundreds of clerks, cares for the stock of over 2,000,000 different *kinds* of parts required to maintain *all* forms of motor transportation on the

Allied fronts. *One* maker in England makes 17 different varieties of trucks and the English use all 17. Of course, there are hundreds of kinds of trucks in use, and all must have spare parts ready, somewhere.

There are approximately 7500 parts in the U. S. war truck and, if the army possessed a million of them, there would still be only 7500 *kinds* of parts to carry for repairs and replacements.

The best driver, the best mechanician in the world, cannot do as well with or as quickly for a strange truck as for one with which they are familiar. With thousands of trucks, all alike, not only need there be less drivers and less mechanics, but these can take their persons and their skill from point to point within the army, and be always ready to exert it to the maximum.

Competent observers have realized and it is generally accepted now as a military doctrine, that successful automotive transport means success at the front—failure in transportation makes even an overwhelming numerical superiority ineffective. There seems no question of the fact that the failures of the Russians were failures due to lack of supplies. The motor truck immortalized itself at Verdun, which, in the last analysis, was held because there was no failure of the trucking of munitions. Allied army officers freely admit that Germany might have reached Paris had her motor truck trains been as adequate for her purpose as was the rest of her mighty war machine and no one needs reminding of what General Gallieni, then governor of Paris, did with taxicabs and trucks in rushing men to the defence of the French capital.

So American army men are jubilant over the fact that we are to have —are now getting—not only plenty of trucks, standardized trucks, strong, well-made, efficient trucks, but trucks which, in power, economy, simplicity sturdiness and "fool-proofness," are several jumps ahead of any hitherto produced.

Naturally, minute details are not being published. Unquestionably the war truck, which is a *war* truck because produced by the necessities of war, will become the peace truck for hauling within its range. Called a three-ton truck, it can carry up to five tons without undue strain. What questions of patent rights, of the use of the hundreds of points of superiority of many makers, pooled in this one super-truck, will be raised when it comes to making this truck for commercial use, can be settled later. At present, intimate dimensions are not being given out. But there are some facts which there is no reason to keep secret.

At the present writing, two completed trucks are on their way over roads from the manufacturers to Washington. The assembler of one of them states the total weight of the chassis without body is 8200 pounds. A 1600-pound body brings the total to less than 10,000 pounds. The engineers under orders to build a stout, robust truck suited to the extreme services of war have not striven for great lightness, but neither have they wasted metal. The engine weighs 1012 pounds, rear axle, with hubs and brake-drums, 1592 pounds, front axle, with hubs 352 pounds, transmission 233 pounds, clutch and case 103 pounds, frame without castings 653 pounds, front springs 148 pounds, rear springs 544 pounds. Weights vary from 40 to 50 pounds with different makers of the engine, and there are smaller variations with other parts and weights taken after production is well under way, which will probably show cuts in these figures.

The engine, a real triumph in design, went together without a hitch. It was almost born off the draftsman table and had no "fine touches" before being put together and tested. Designed for using the heavier fuels it showed 58 horsepower at 1350 r. p. m. and the torque curve was better than was anticipated. This, too, in face of the fact that engine makers, given blueprints, raced to see which could produce a war-truck engine running, first.

The different makers completed their tasks with great speed. The Continental Motor Company, one of the several participating in the program,

had an engine running 19 days and 18 hours after receiving blueprints. The Waukesha Motor Company had an engine running in 11 days and 7½ hours from the time the blueprints reached its factory. They did not make all patterns for castings or all dies for forgings, some having been made previously but did do most of the machining. Four or five makers developed the engine by dividing the different parts between them, one making several parts not only for itself but for the others, thus saving time. The Continental Company made cylinders, gearcase cover and small parts such as pumps, bushings, etc. The Waukesha Company manufactured cylinder heads, crankcases, intake and exhaust manifolds, roller push-rods, etc. The Wisconsin Company made the lower part of the crankcase.

Patriotic manufacturers of both raw and finished products completed the units in record time. The Park Drop Forge Company worked continuously in three shifts and sunk dies for the crankshaft in seven days, an operation rarely completed in less than three weeks. The Werra Aluminum Castings Company produced the main crankcase pattern and cast it in five days, a three to four weeks' job. Continental completed the pattern for the cylinder pairs in slightly over five days, an accomplishment best appreciated by engine manufacturers.

Showing the co-operative talent employed, it can be said that the crankcase is Continental, the cylinders Waukesha, the oiling system a combination of Wisconsin and Buda, the pistons Hercules, the timing-gear system a combination of Buda, Wisconsin and Continental, governor a combination of Kelly-Springfield and Waukesha, and the camshaft a composite, as is the transmission, the axles, and other parts.

So confident are both the Quartermaster Department, the Society of Automotive Engineers, and the Council of National Defence that this truck is as good as it can be made, that orders for parts for 10,000 of them have been placed. More than 60 manufacturers have participated, groups of three or more generally receiving orders for the different parts. No difficulty is being experienced in getting the orders filled—the manufacturing capacity available to make these trucks is double that required, and there are more concerns anxious to co-operate than there are orders to go 'round.

General Baker, for long a student and an enthusiastic advocate of adequate army motor transportation, has been at the head and front of this manufacturing, inventive, designing achievement, and by his knowledge and enthusiasm has done much to make it a possibility. But General Baker has publicly and with the utmost sincerity put the whole credit for making this truck where it belongs.

"It is the work of the Society of Automotive Engineers" he has said, very simply. "They did it. They have long been friends of the War Department and lately have co-operated most extensively. Now they have given their time, ungrudgingly, their secrets, worth streams of gold, without compensation, their effort, their knowledge, their enthusiasms, for patriotic motives alone. They have done a big job, and while it is probable that the full story of their sacrifice, their patriotism and their wonderful achievement will never be wholly realized by the public at large it will never be, can never be, forgotten by the soldiers it arms with a better arm than any other country possesses. I cannot make it too strong that the S. A. E. has done a wonderful work, in a wonderful way, and produced a wonderful result."—*Scientific American*, 27/10.

LAUNCHING SHIPS BOTTOM UP.—Considerable space has been devoted to the subject of ferro-concrete construction as applied to building vessels, a method which is undoubtedly destined to a brilliant future as far as the construction of lighters, floating docks and similar structures is concerned. In a recent article on the subject of ferro-concrete construction in Norway, it was stated that the first seagoing vessel built at the Porsgrund yards as an experiment had been launched bottom up, special arrangements having

been adopted to right the structure after launching. We now reproduce herewith diagrams showing how this operation was effected together with photographs giving an outline of this vessel, the lighter *Beton I*, which has a capacity of 200 tons dead-weight and is to be equipped with a 70-horsepower hot-bulb engine. The builders are the Porsgrund Cement Casting Company, which have been experimenting with concrete since 1913, at which time they had designs prepared for various types of craft. In 1915 a pontoon of reinforced concrete was built by them for the municipality of Porsgrund, which is claimed to have been the first ferro-concrete vessel built in Norway. This pontoon has a length of but 52.6 feet and was first employed for the transport of sand. The difficulties encountered in the construction of this vessel led to the belief that they would be overcome in the case of lighters with a fairly rectangular section were great care shown, but when it came to the building of vessels of ordinary section, the difficulties would be serious. The director of the

"BETON I" LEAVING THE WAYS BOTTOM UP

Porsgrund Company, Mr. Harald Alfsen, had from the first been convinced that ferro-concrete boats should be built bottom uppermost and by using only an inner shuttering, or only outer boarding, as far as the vertical sides were concerned. In order to do this, however, the problem of how to turn a boat of fair dimensions upright had to be solved. The solution was found last year and consists in letting the boat take the water bottom upward and in the position in which it is cast. According to report, the launching of the vessel was a complete success, the lighter taking the water bottom up as expected and righting herself as contemplated by the calculations in the space of 20 minutes. The exact dimensions of this vessel are indicated in the drawings annexed herewith, so that it will suffice to recall that in the present method of construction the vessel, instead of being built of steel plates attached to a series of frames, consists of an inner hull of wood which serves as a mould for the whole structure. The steel reinforcement and the cement are formed around this, so that when the construction is complete there rests on the launching way the inner wooden mould and the surrounding outer reinforced concrete hull, both

bottom upwards. The inner mould is divided into watertight compartments and when the vessel is about to be launched they are full of air. The middle compartment is open at the bottom so that when the vessel has left the ways, the water gradually enters this compartment, the air escaping through a series of pipes at the sides of the hull. In the diagram shown (A) represents a section of the vessel immediately on taking the water; the inner mould divided into compartments is seen, together with the outer reinforced concrete hull of the vessel, and it will be observed that as yet there is no water in the middle compartment of the mould, owing to the air not escaping rapidly enough through the vent pipes. As the air escapes, however, the water rises in this compartment, the vessel gradually sinking as it loses its buoyancy, until the water reaches the level of the two upper side compartments which are also gradually

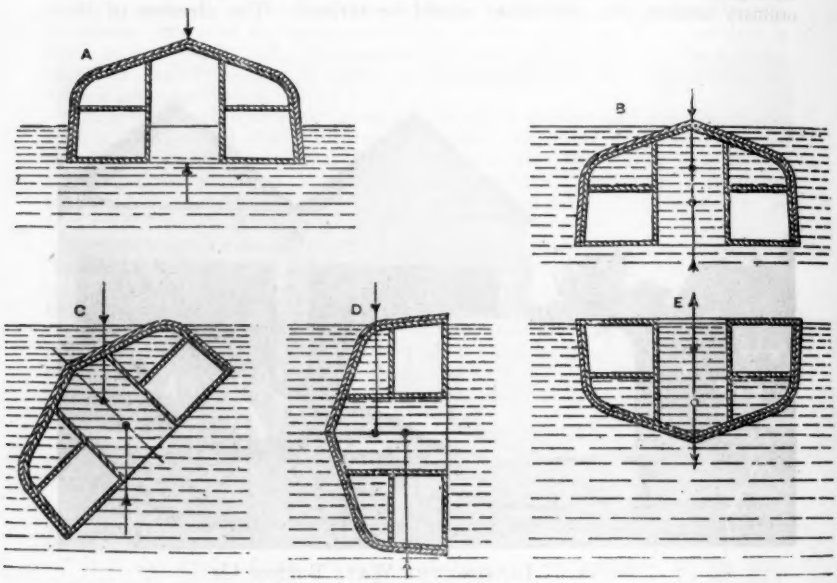
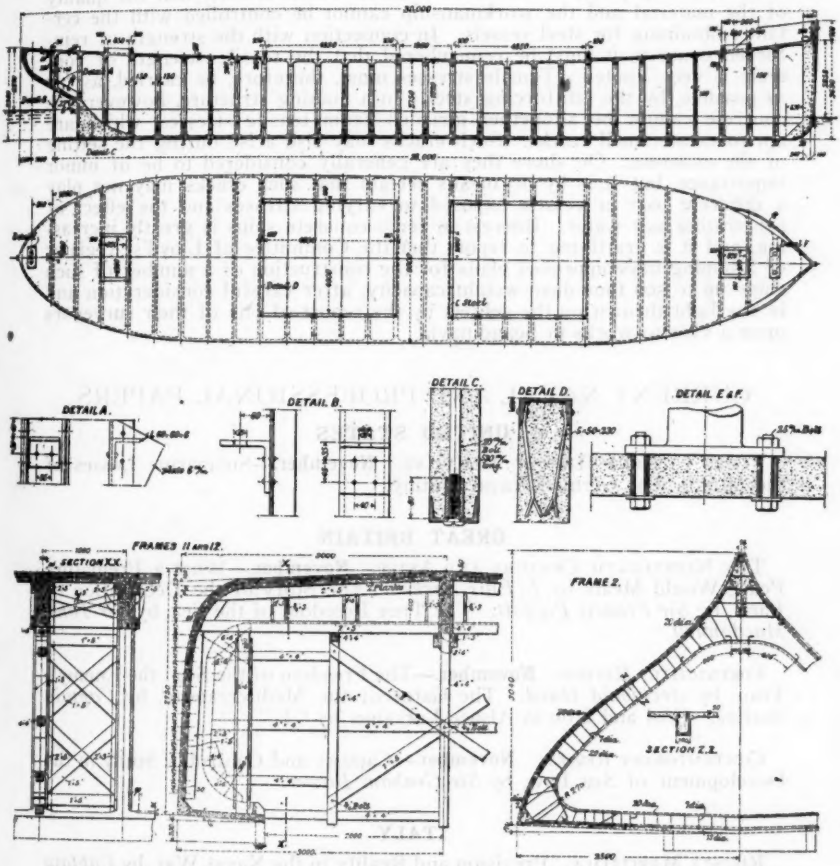


DIAGRAM SHOWING EFFECT OF GRADUALLY FLOODING COMPARTMENTS OF MOULD AFTER LAUNCHING

flooded, so that a position is gradually reached as shown at (B) when the vessel is submerged to its maximum amount. The lower side compartments are never flooded and thus the vessel is in a state of unstable equilibrium, the center of gravity being considerably lighter than the center of buoyancy as shown. If now from any cause whatever the vessel heels to one side or the other, the weight of the hull and its contents acting through the center of gravity and the pressure on the submerged area acting through the center of buoyancy, form a couple, the moment of which tends to turn the vessel on a longitudinal axis as shown at (C). The moment of this couple has its maximum value when the vessel is in the position shown at (D), after which it gets gradually less and less until the vessel floats in the correct position as shown at (E), when the moment of the couple is again zero, but the vessel is now in a state of stable equilibrium. The slightest list to one side or the other after the vessel has been launched and the compartments filled is thus sufficient to

cause her gradually to heel completely over until she floats in a normal position. The flooded compartments are then pumped out, and the mould is removed, this being used again in the construction of another similar vessel.

As stated above, ferro-concrete is undoubtedly destined to play a brilliant part in the construction of such marine structures as floating docks and lighters, in which weight does not play a very important part. But when



GENERAL AND DETAIL PLANS OF SELF-PROPELLED FERRO-CONCRETE LIGHTER "BETON I," BUILT BY THE PORSGRUND CEMENT CASTING COMPANY

it comes to seagoing vessels of large dimensions it must be remembered that there is at present practically no available datum because experience derived from ferro-concerte construction on land is not directly applicable to vessels. Fixed structures, as a rule, are only subjected to a load, the maximum of which is known, and which only acts in one direction; whereas the load to which a vessel may be exposed cannot be directly calculated, and its direction is constantly varying, especially in a turbulent sea. Under these circumstances, pending fresh experience, the strength of

a ferro-concrete vessel must be determined by comparison with that of a steel vessel of the same type and dimensions. This, however, is a difficult problem, as a steel vessel, on account of peculiarities in its construction and building, in some directions may have more material than necessary from general strength considerations, and also because several qualities of concrete, which it is necessary to know in order to make fairly reliable comparisons with steel vessels, are not yet sufficiently ascertained. The actual building process of a ferro-concrete vessel is such that the quality of the material and the workmanship cannot be controlled with the certainty obtaining for steel vessels. In connection with the strength of reinforced concrete it must be remembered that the tensile strength of concrete is very limited. Tensile stresses must, therefore, be carried, as far as possible, by the reinforcing steel. In a floating structure, however, the concrete cannot be altogether guarded from tensile stresses, which are apt to create small cracks. Such cracks may also arise during the setting of the concrete. On shore they are generally considered to be of minor importance, but it is by no means certain that such cracks may not play a different part in vessels exposed to varying stresses and the effect of penetrating salt water. Interest in ferro-concrete ships is greatly increasing, and it is gratifying to report that the Committee of Lloyd's Register of Shipping have approved plans for the construction of a number of such ships up to 500 tons dead-weight capacity, after careful consideration and in the light thrown on the subject by the report of one of their surveyors upon a visit to works in Scandinavia.

CURRENT NAVAL AND PROFESSIONAL PAPERS

UNITED STATES

TIMES CURRENT HISTORY MAGAZINE. **November.**—Submarine Losses of the Month, The German Naval Mutiny.

GREAT BRITAIN

THE NINETEENTH CENTURY AND AFTER. **November.**—What a Premature Peace Would Mean, by *J. Ellis Barker.* The Story of the Declaration of Paris, by *Sir Francis Piggott.* The True Freedom of the Sea, by *Sir John Macdonnell.*

FORTNIGHTLY REVIEW. **November.**—The Freedom of the Sea: the Enemy's Trap, by *Archibald Hurd.* The Gates of the Mediterranean, by *Captain Battine.* Coal and Iron in Alsace Lorraine, by *" Y."*

CONTEMPORARY REVIEW. **November.**—Capture and Control, a Study in the Development of Sea Law, by *Sir Graham Bower.*

ITALY

RIVISTA MARITTIMA. Prevision and Reality in the Naval War, by *Captain Romeo Bernotti.* (A review of the achievements of sea power in the war.)

HAMMERING THE "HINDENBURG LINE" Copyrighted by Central News Photo Service

A remarkable photograph showing a battery of heavy British howitzers in action against the German lines in Flanders. The "Hindenburg Line" through the medium of guns of this type has developed into the most flexible battle line of history. It has acquired the resiliency of rubber and even now is "stretching" to the breaking point.

Flanders. The "Hindenburg Line" through the medium of guns of this type has developed into the most flexible battle line of history. It has acquired the resiliency of rubber and even now is "stretching" to the breaking point.

INTERNATIONAL NOTES

1. NAVAL WAR NOTES.....3025
2. DIPLOMATIC NOTES 3070

NAVAL WAR NOTES

PREPARED BY

LIEUTENANT COMMANDER I. C. KIDD, U. S. Navy

NAVAL OPERATIONS
- Atlantic 3025
- Pacific 3031
- North Sea 3032
- Baltic 3040
- Adriatic 3049
- Black Sea and Turkish Waters.....3050

U. S. ARMY NOTES 3050
GENERAL NOTES 3059
INDEX OF WAR VESSEL LOSSES 3070

ATLANTIC

SINKING OF U. S. TRANSPORT "ANTILLES."—Survivors of the United States transport *Antilles,* which was sunk by a German submarine while being convoyed on her homeward trip by American warships, were landed at a French port, October 21, by auxiliary vessels.

The torpedo struck the ship at a quarter to seven on Wednesday morning, October 17. Many of those on board were killed in their berths and others while dressing. The explosion killed the engineers, oilers and mechanics and those of the crew who were in the bunks below.

All the survivors commend the captain of the *Antilles* and the men of the gun crew, who stuck to their posts while the officers searched with field glasses for the submarine until the waves closed over the vessel.

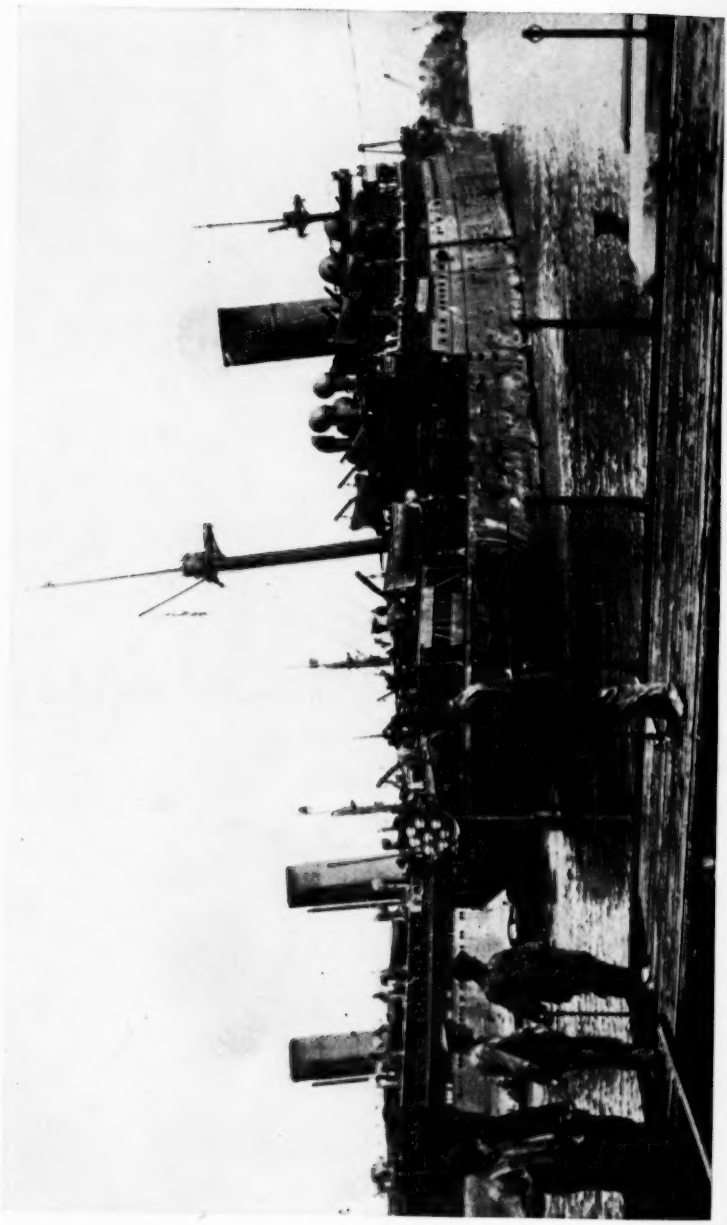
When the *Antilles* sank 40 or 50 men were at the stern. Most of them leaped 50 feet or more into the sea as the stern rose to a perpendicular position and some were drawn down by the suction of the sinking vessel.

The submarine was not sighted either before or after the explosion. The sea was running high at the time, making it difficult to save the crew and passengers. Some survivors, clinging to débris, were in the water an hour before they were sighted by the lifeboats.—*N. Y. Herald,* 22/10.

An Account of Sinking by a Survivor.—Tribute to the efficiency of the United States Navy is the keynote of the tales told by survivors of the transport *Antilles.*

"Until Wednesday morning, just after sunrise, the voyage was uneventful. Then, without warning, a torpedo struck us amidships, the force of the explosion being felt chiefly in the engine-room. Our engines were shashed to smithereens and we began taking water fast.

"Fortunately, there were only a few passengers, and everybody was up on deck in mighty quick time. The *Antilles* began to go down bow first before the first lifeboat was launched. One of our boats was smashed



THE U. S. S. "ANTILLES" ARRIVING AT A FRENCH PORT WITH TROOPS
(Note the German Prisoners in Foreground)

Copyrighted by Kadlee & Herbert, N. Y.

against the side of the ship by a big wave, but we finally got three launched, loaded with sick soldiers, medical officers and men and some of the crew.

"I jumped overboard just after the boats were off and by hard swimming managed to get aboard one of them. We pulled away as hard as possible to escape the suction and then rested on our oars as the ship plunged under the surface. Clinging to the stern were a handful of sailors, some of whom miraculously kept their heads above water and were picked up by our boats or those of other vessels.

"I believe 20 men at least were killed in the engine-room when the torpedo burst. We saw the last of the ship five minutes later.

"Boats saved everyone that could be found. The captain of the *Antilles*, who stuck to his bridge till the ship sank, was picked up clinging to a bit of wreckage. The gun crew also remained at their posts until the very last minute."—*Baltimore News*, 23/10.

Service Men Insured.—All persons in the military and naval service who perished with the American transport *Antilles*, torpedoed by a German submarine, October 17, came within the scope of the new war-insurance law, the Treasury Department announced last night, and thereby automatically carried insurance to the amount of $6000 each.

This sum will be paid to the families of the dead soldiers and sailors in monthly installments of $25 each over a period of 20 years. It is in addition to compensations which will be paid to widows, children and dependent mothers of the men. A widow, for example, will be paid $25 insurance and $25 compensation, a total of $50. While the $25 insurance is a fixed maximum in cases where no application for insurance was made, the additional compensation varies from $20 for a motherless dependent child to a maximum of $75 for all dependents.

The insurance of $25 a month will be paid under the section of the law providing for automatic insurance of all American soldiers, sailors and marines, without application, for 120 days after the publication of regulations providing for the issuance of policies. These regulations were published early in October and the time limit prescribed by law will not expire till February 12 next.

Approximately 70 persons went down with the *Antilles*. What percentage of this total is affected by the law at present is unknown, but will be determined upon receipt of advices establishing the identity of those who perished. The number of soldiers has been established definitely at 16, but the status of many of the remaining dead as yet is unknown by officials here. How many of the remainder are sailors in the naval service yet has to be determined.

Not only will the families of the dead receive insurance and compensation under the new law, but those who were injured, if any, while in the military or naval service, also will share in its provisions for indemnities.

Application of the new law to the *Antilles*, the first case where any large number of casualties was involved, was pointed to last night by Treasury officials as one of the many vital reasons why all persons who can should buy Liberty bonds.

"The money to pay both compensation and insurance," it was stated, "is expected to come in large measure from the sale of bonds of the second Liberty loan."—*Washington Post*, 23/10.

SPIES CRIPPLE TRANSPORTS.—Traitors or spies in the navy yard, it was learned, October 22, have done their work so well that at least two of the German liners taken into the government service have been compelled to put back for further repairs after they were well down the bay, outward bound.

Rumors are current of other havoc wrought on vessels ostensibly fit for sea, which was discovered before an actual start was attempted.

Secret-service men have been called upon by the officials of the yard to aid them in the hunt for the guilty men.

In both cases where the voyages of the vessels were interrupted it was found that tools had been inserted into almost inaccessible and extremely vulnerable parts of the machinery. In one case a sledge-hammer was so placed that when the engine was put into action extensive damage was done.

These ships both had been subjected to rigid scrutiny before they were taken out of the hands of the repair gangs and reported seaworthy. Precautions now have been redoubled, and until the exhaustive examination has been completed certain parts of the boats are virtually sealed up and are guarded by sentries.

Reports are current, however, of more recent discoveries which apparently set at naught the strictest prohibitive measures. That officials of the navy yard still believe that the peril exists is shown by the fact that secret-service men have been called in.

All evidence tends to confirm the belief that employés of the yard have been crippling the vessels. Besides the fact that such men would be the ones most easily to gain access to the ships, the manner in which the work was done showed a knowledge of nautical mechanics.—*Baltimore News*, 23/10.

OFFICIAL STATEMENT IN REGARD TO THE U. S. S. "CASSIN."—Acting Secretary of the Navy Roosevelt authorizes the publication of the following information received from Vice Admiral Sims:

"The destroyer recently mentioned in dispatches made public as being injured by a torpedo was the U. S. S. *Cassin*, commanded by Commander W. N. Vernou.

"While this vessel was on her patrol station a submarine was sighted on the surface at about 5 miles distance. The *Cassin* immediately proceeded at full speed toward the submarine with her crew at their battle stations. She searched the area for about 30 minutes, zigzagging back and forth, when the commanding officer, Commander Vernou, sighted a torpedo running at high speed near the surface about 400 yards away, headed to strike the *Cassin* amidships. Realizing the situation, the commanding officer rang for emergency full speed ahead on both engines, put the rudder hard over, and was just clear of the torpedo's course when it broached on the surface, turned sharply toward the vessel, and struck the stern of the *Cassin*.

"Fortunately only one engine was disabled, thereby permitting the destroyer to remain under way, circling in search of the submarine. After about an hour the submarine exposed its conning-tower long enough for the *Cassin* to fire four shots. Two of the shots fell so close to the submarine that it was forced to submerge immediately and was not seen again. The *Cassin* continued to search until dark when, having been joined by other British and American patrol vessels, she was taken safely into port."

Vice Admiral Sims states that the behavior of the officers and the entire crew was admirable. There was no excitement on board, the men remaining quietly at their battle stations throughout the night except when called to other duties. He commends the British Navy for the prompt and efficient assistance rendered the *Cassin*.

Admiral Sims gives special credit to Commander Vernou for his vigilance and prompt action which probably saved the *Cassin* from total loss. He also commends Lieutenants Maclaran, Saunders and Parkinson for their ingenuity in effecting temporary repairs and for their coolness and efficient work.—*Official Bulletin*, 23/10.

MERCHANTMAN ENGAGES U-BOAT.—The encounter of the American steamship *Luckenbach* with a German submarine on October 19 was reported to the Navy Department, October 24, in dispatches from Vice Admiral Sims, commanding the American naval forces in European waters.

Concerning the engagement Franklin D. Roosevelt, Assistant Secretary of the Navy, made the following announcement:

"The Navy Department is informed that the American steamship *Luckenbach* was engaged by an enemy submarine on October 19. The engagement lasted from 25 minutes to 8 a. m. until 20 minutes to 12 a. m., and was broken off by the arrival of an American patrol vessel. The *Luckenbach* was hit several times, but no serious damage was done to the ship.

"Seven of the crew of the *Luckenbach* and two members of the armed guard were wounded."

No details of the fight between the *Luckenbach* and the submarine were given in Admiral Sims's report, but the incident is regarded by naval officers as another demonstration of the effectiveness of trained gun crews on merchant ships. The undersea boats usually do not approach within close range of the American armed ships except by stealth.

It is assumed by naval officers that the German submarine sighted the *Luckenbach* at a distance and did not have sufficient speed to approach the vessel under cover. If it had submerged its speed would have been reduced to such an extent that the *Luckenbach* would have been able to make a safe escape.

The German commander had no alternative but to use his gun or guns, not being able to get within torpedo range and not caring to run the risk of the guns of the merchant steamship at long range to afford as small a target as possible to the American gun crews.

The chances of a hit by a steamship under these circumstances are few. The only hope is to keep the submarine under fire at as long a range as possible and send out a distress signal. In the case of the *Luckenbach*, although none of the shots apparently went home, the submarine was kept at such a distance that it could not accomplish its purpose before the arrival of the patrol vessel.—*N. Y. Herald*, 26/10.

ENGLISH DESTROYER AND CRUISER SUNK.—The British merchant cruiser *Orama* has been torpedoed and sunk, it is announced officially. A British destroyer has been sunk in collision.

The announcement follows:

"One of His Majesty's destroyers has been sunk as the result of a collision. Two officers and 21 men were saved.

"His Majesty's armed mercantile cruiser *Orama*, Commander W. Moorson in command, was torpedoed and sunk on Friday. There were no casualties."

The *Orama*, 12,927 tons gross and 351 feet long, was built in Glasgow in 1911. Before being taken over by the British Admiralty she was operated by the Orient Steam Navigation Company of Glasgow. She was one of the small British squadron which, in March of 1915, off the Chilean island of Juan Fernandez, sank the German cruiser *Dresden*, which escaped at the time. The other vessels of the German Pacific squadron were destroyed by the British in the battle off the Falkland Islands three months previously—*Washington Post*, 24/10.

GERMANS SINK GUNBOAT IN HARBOR OF BAHIA.—Germans, October 27, set on fire and sank the German gunboat *Eber*, a vessel of 984 tons, which has been lying at the port of Bahia. This was in anticipation of the seizure of the gunboat by the Brazilian authorities, torpedo-boat destroyers having received orders to proceed to Bahia to take possession of the *Eber*.—*N. Y. Times*, 28/10.

U. S. TRANSPORT "FINLAND" DAMAGED BY TORPEDO.—The American transport *Finland* is in dry dock in a French port. The vessel received such slight damage from the German torpedo which recently struck her that it will not be long before she puts to sea again. The torpedo struck a coal

bunker, which lessened the effect of the explosion. Among those on board the *Finland* were several survivors of the crew of the transport *Antilles*, which was torpedoed and sunk some time ago.

The announcement that five of the men were drowned indicated to officials that the *Finland's* company left the vessel in small boats until it was made certain that the vessel would remain afloat. The capsizing of one of the boats in launching might account for the drowning of the men.

It is assumed that two of the armed guard were killed by the explosion of the torpedo, and that the missing one probably was blown overboard by the explosion, as was a seaman on the destroyer *Cassin* when she was torpedoed recently.—*Washington Post*, 3/11.

ATTEMPT TO BOMB U. S. TRANSPORT.—A carefully-laid plan to blow up a United States transport was frustrated by the arrest, October 3, of a man carrying a powerful bomb on board a ship which is to be turned over to the navy for the transport of troops this week. The prisoner is a Lithuanian, who was employed as a carpenter in a shipyard in this port, where a number of the German ships taken over by the government are being repaired. As a native Russian, he had a pass to go to and from work. The Federal officials refused to give out the name of the shipyard or the name of the ship, except to say that she was one of the largest of the German liners seized here. The repair work on this ship has been completed and she will in a few days be taken over by the navy for the transport of American soldiers to France.

This carpenter's duties were in the shipyard proper and he had no business on the ship. About 4 o'clock in the afternoon, October 3, he was stopped as he was walking out on the pier and asked where he was going. He replied that he had business on the ship. He was told in accordance with a recent order by United States Marshal Powers, that he must be searched.

This discomfited the man, and he said confusedly that he had suddenly changed his mind about going on the ship. The naval officers became suspicious, and informed him that he was to be searched anyhow. He protested volubly, saying he would quit his job and never come back if they wouldn't search him.

By this time he had a sailor on either side of him, while others made the search. In the left-hand outside pocket of his overcoat was found a steel cylinder, slightly more than a foot long and three and one-third inches in diameter.

Experts at the navy yard found the steel cylinder was a most ingenious and powerful bomb. What was more interesting was the manner in which it was made and the materials employed. A part of the timing mechanism was of platinum, and the infernal machine had an electrical detonating apparatus that was not made outside of a machine shop, with most expensive materials available. One end of the cylinder was closed with sealing wax. The interior was filled with steel filings, guncotton, chlorate and sulphate of potash. There was a time-lock arrangement for setting it off by electricity, and it was in this arrangement that the platinum was used. The upper end was closed with charcoal.

The arrest of the carpenter was the first instance of the authorities catching a man in an actual attempt to cripple or destroy a United States transport. There was speculation last night as to whether the bomb could have been set yesterday to go off at a time distant enough to assure that the ship would be on her way across the ocean, or whether the attempt was simply to cripple the ship and delay or prevent her use by the navy.—*N. Y. Times*, 4/11.

SINKING OF NAVY PATROL BOAT.—The Navy Department on October 6 announced the disaster to the patrol boat *Alcedo* in this statement:

"The Navy Department has been advised by Vice Admiral Sims that at 1.30 a. m., November 5, the American patrol boat *Alcedo*, a converted

yacht, was torpedoed and sunk by a German submarine in the war zone. One officer and 20 men are missing.

"The ship sank in four minutes after being struck. Several vessels were searching for possible survivors at the time the report was made. The *Alcedo* carried a crew of seven officers and 85 men."

The *Alcedo* is the first American war vessel to go down in the war.

The waters of the war zone, since the American sea forces began their work of patrolling in conjunction with the British and French, have been swarming with American vessels of all sizes, from the small submarine searchers, picket boats, yachts, destroyers, on up to the larger vessels.

Hundreds of thousands of miles have been patrolled and the fact that more vessels have not been sunk by the Germans attests the vigilance of the scouting vessels.

The steam yacht *Alcedo* was sold to the government last June by G. W. Childs Drexel, and was removed to the New York navy yard, where she was reconstructed.—*Army and Navy Register*, 10/11.

PACIFIC

GERMAN COMMERCE RAIDER "SEEADLER".—The full story of the cruise of the German commerce raider *Seeadler* has been obtained by the Navy Department from Capt. Haldor Smith of the American schooner *R. G. Slade* and three other mariners who landed at Tutuila in an open boat, September 29, after being marooned on Mopeha Island by the master of the *Seeadler* when the raider grounded and was abandoned.

Relating the story of the capture of his ship, the *Slade*, Capt. Smith said:

"I left Sydney, April 24, 1917, and proceeded without any incident until the evening of June 17, when I was in latitude about two north and longitude 150 west. On the evening of June 17, about five o'clock, the second mate reported to me that a ship was firing on us. I went on deck and looked aft, and instantly, as I came on deck, they fired again, and I saw the shell fall short about two miles. She was about eight miles off. There was a heavy squall starting to eastward—wind favorable to this time—and I thought it possible to get away and kept holding on. But she kept firing on me at intervals of about five to ten minutes and was coming up on me fast.

"The ninth shot, fired about six o'clock, struck very close, passing the poop and splashing water on the ship. Then I concluded that there wasn't any use, and I lowered down spanker, clewed down topsail, hoisted American flag, and hove to. About seven o'clock the raider was up alongside and asked what ship. I told him what it was, and he told me to lower down sails, and stand by, and he would send an officer aboard me. Shortly after, the prize officer came aboard, and a doctor and about ten men. These officers were in uniform. They told me to leave the ship and to go on board the raider, and they would give me time in the morning to pack my clothes.

"They took all our men aboard the raider except the cook. Next morning I went back on board with all my men and packed up. We left the ship with our belongings, June 18. We were put on board the raider again. Shortly after I saw from the raider that they cut holes in the masts and placed dynamite bombs in each mast and put fire to both ends of the ship and left her. I saw the masts go over the side and the ship was burning from end to end, and the raider steamed away."

Capt. Smith said the raider was a full-rigged ship of steel or iron, about 2300 tons, propelled by oil-burning engines. Her captain was Felix Graf von Luckner, active captain-lieutenant; the first lieutenant, Alfred Kling, and prize officer, Richard Pless. There also was a chief engineer, a navigating lieutenant, a mate and a doctor. All told, her complement was 68 officers and men. Mounted between decks, she carried two 4-inch guns (10.5 cm.) and two machine guns. The name on her bow was *Irma*.

When the men from the *Slade* arrived aboard the raider they found nine prisoners from the American schooner, *A. B. Johnson* of San Francisco, captured three days before. On July 8, Smith stated, the schooner *Manila* was captured and dynamited after the ten officers and men had been taken off. Aboard the *Seeadler*, he said, was a Hollander who had been taken off the first ship captured and was kept aboard because he had made an insulting remark to the captain about German money.

For about three weeks the raider kept beating up and down looking for passing ships. Meeting none, they went south to Mopeha on July 31, anchored on the lee side of the island and on August 2 the ship was driven hard and fast ashore. The three American captains had gone ashore with the German officers on a picnic, and the prisoners were left on the ship. Cannon were fired to tell the party the ship was in danger, but when they returned they found the propeller twisted on the coral reefs and the vessel beyond help. After working all afternoon, they gave her up as lost and took ashore everything they could move, including the boats, gear and wireless. The wireless plant, a very powerful one, was set up between two cocoanut trees. It was equipped with sending and receiving apparatus and without difficulty they were able to hear Pago Pago, Tahiti and Honolulu.

On August 23, Capt. Smith related, the German officers fitted up and armed a small boat and started for the Cook Islands, or the Fiji Islands, where they hoped to capture an American ship and come back for the crew. Count von Luckner, the master, was in charge. They were never heard of again at Mopeha Island.

After their departure wireless messages in code from Pago Pago to the American consul were intercepted, and the German crew believed the count had been captured. On September 5, a French trading schooner from Papeete, the *Lutece*, put in at the island. First Lieutenant Kling took a motor boat and machine gun and captured the ship. She had a large cargo of flour, salmon and beef and a supply of water. Kling and his crew dismantled the wireless plant and left the island in the *Lutece* that night, leaving 48 souls, including the Americans, the crew of the French trader and four natives of the island. Scant provisions, and bad at that, were left them. Besides these they found a few cocoanuts, but the great number of rats on the island destroyed them. There was plenty of fish and turtles.

A small boat had been left behind and the marooned men fitted it up. The captain of the *Manila* with a small crew started out in the boat for Tahiti on September 8. They failed to reach Tahiti and returned, exhausted, on September 16. Capt. Smith, with three men, took the small boat and managed to reach Pago Pago ten days later.

Capt. Smith said that after the *Seeadler* was abandoned, the Germans used dynamite to destroy the ship's masts, so that passing vessels might not sight them. They were unable to sink the *Manila*, as she was loaded with lumber, and the derelict now probably is a menace to navigation. Although the *Seeadler* may be a wreck, it is possible that her guns still are in position to use.

Forty-four persons still are on Mopeha Island, but Capt. Smith said they were not in immediate danger of starvation. There are turtles and fish on the island, and the water, while brackish, is not dangerous. The only danger, he said, is of sickness. One man had gangrene when he left. Some medicine was left, but he doubted that the survivors knew how to use it.

Recent dispatches indicate that the captain of the *Seeadler* and five of his crew were captured on September 21 off the Fiji Islands by Fijian constabulary. What became of the men who left Mopeha Island in the *Lutece* is not known.—*The Sunday Star*, 11/11.

NORTH SEA

GERMAN AIR RAID ON LONDON, OCTOBER 20.—Of the 27 deaths officially reported as the result of the air raid, October 20, seven persons were killed

outright by bombs that fell in the shopping district of London and 13 by a torpedo which destroyed three houses in the residential quarter.

It is reported from an eastern county that seven Zeppelins remained overhead there for several hours and dropped bombs, including a number of incendiary nature. No casualties resulted.

The following official announcement was made:

"In the airship raid of October 20 the casualties in all districts were: killed, 27; injured, 53. There was some material damage to houses and business premises."

"The silent raid" is the name given to the Zeppelin raid on London, October 20, the first in 12 months. Many Londoners awakened, October 20, with the feeling that there was a good deal to say for the official view against warning of night air raids. Although warning was given early in the evening, the people, after waiting hours for the sound of gunfiring, went to bed, believing the raiders had been intercepted off the coast. Then, suddenly, two loud reports startled light sleepers, but as nothing followed a majority thought it merely was the firing of anti-aircraft guns in distant districts.

Seven or more Zeppelins crossed the east coast at about eight o'clock four going in one direction and three in another. At half-past 11 o'clock one Zeppelin passed out on the homeward journey. This airship dropped six bombs at 11 o'clock and three at quarter-past 11. The noise of its engines was heard for 20 minutes.

The *Evening News*, commenting on the raid, says:

"Last night another of our fond war delusions—due, we suppose, to the phlegmatic perversity of our national character—was shattered. Statements from authoritative quarters made at various times had led us to believe the airship menace had been mastered. How far this is from being the case is shown by the official report.

"It may be pointed out that the moon—a feeble one—set at eight minutes after seven. It seems, therefore, that the moon is not a factor in German air calculations, which most people suppose."

In a suburb of London shortly before 11 o'clock, October 20, five or six bombs were dropped in close proximity, but no damage was done.

An aerial torpedo fell within the London area. Persons in the neighborhood of the destroyed houses say that the residents were in their homes at the time.

Eight bombs were dropped in a small town outside of London. Two were of a high explosive composition and fell in open spaces without causing damage. Six were incendiary bombs, of which five caused no fire.

In a populous London district one of the explosive bombs demolished a row of workmen's cottages.

Commenting on the German air raid, the *Star* says:

"Six or seven Zeppelins travelled over England, October 20, dropped bombs and travelled back to their airdromes. There is no mention in the British official reports of their having been attacked; certainly none was brought down.

"There is a new fact, and it is explicable only on one or two theories—first, that the defences which proved adequate against the 1916 Zeppelins are no match for their successors; or, secondly, for some reason these defences were not brought into full play.

"The Zeppelins not only travelled very high last night, but they did what has always been a matter for wonder that they did not do before—they muffled their engines. The first alarm came from one of the provinces, where a bomb had been dropped. In London also projectiles 'fell from the blue.'

"The effect of silencing the engine is to lessen its power for the time being, and the fact that at places on the coast the once familiar roar was heard shows that the cut-out was employed wherever conditions permitted. So far as London is concerned, nobody seems either to have seen or heard

the raiders. But Londoners know a great deal more about the raid than the authorities have yet disclosed or the censor has yet permitted to be published. They know when and where bombs or torpedoes fell in various districts, they know what effect each had; they can calculate how long the raider was over the metropolitan area. They are asking questions and drawing deductions. If the government has any reassuring statement to make, it should be made promptly."—*N. Y. Herald,* 21/10.

Four Zeppelins Lost in Raid.—Friedrichshafen is in mourning over the loss of at least four Zeppelins in the ill-fated raid on England, according to advices received here from Swiss towns on Lake Constance. The majority of the crews of the destroyed Zeppelins lived in Friedrichshafen, where they received their training. The King of Wurttemberg has sent messages of condolence to the families of the men lost in the raid.

The Swiss newspapers express the opinion that the disaster in France is a death blow to aircraft of the Zeppelin type.

The newest Zeppelins, according to information received here, are 760 feet long and 78 feet in diameter. They have eight engines, developing 2000 horsepower, and are able to keep in the air 50 hours with a crew of 20 men and a load of projectiles.—*N. Y. Herald,* 20/10.

Zeppelin Losses.—Germany probably lost one-half of her total effective fleet of super-Zeppelins as a result of the raid of October 20 over England, according to official cablegrams received here. All France is exultant over what the dispatches declare to be the greatest defeat administered to an air fleet since the beginning of the war. The gratification is more intense because it is now known that the German raid was an attempt to carry out a fearful threat of vengeance made four days before.

On that occasion the German Government sent out a warning to both France and England of dire punishment to follow what the Germans declared to be unwarranted and inhuman attacks by British and French aviators upon peaceful German towns. Reprisals were threatened in an official German communication, which in part read:

"For every brick which falls from peaceful German homes whole rows of buildings will be overthrown in Paris."

The official French report of the attempted German raid reads as follows:

"The first Zeppelin brought down fell at St. Clement, on the borders of the forest of Mondon, 10 kilometers from Luneville. It was seen at 20 minutes past 6 a. m., journeying with two other Zeppelins. It was at once attacked by one of our army's defence sections. At first a series of shells were fired at the Zeppelin when it was distant 4000 meters. The Zeppelin promptly rose to a height of 5500 meters. In a fresh attack by the aircraft guns the fourth shell struck the outside envelope and the Zeppelin caught fire. It remained a mass of metal and India rubber and broken propellers. Five dead bodies, horribly mutilated, were found near the Zeppelin. Others must be buried under the ruins, which are still smoking. There could not have been any bombs left in the Zeppelin, as no explosions were heard. The apparatus had four propellers.

"About 20 minutes past 2 p. m. Zeppelin No. 49 was forced by our aviators to come to earth near Bourbonne les Bains. It is intact. The commanding officer and 17 men of the crew are prisoners. [This is the airship referred to at length in to-day's cable dispatches.]

"A little later the third Zeppelin, the L-50, came down at Dammartin, near Montigny le Roi, and 2 officers and 14 men of her crew were captured. Two of the crew were slightly wounded.

"The Zeppelin's crew detached a car which they entirely destroyed. The Zeppelin, without ballast, went off with four men. From the declaration of the prisoners this Zeppelin left Oldenberg for London, October 19, but was unable to reach the English capital.

"Two Zeppelins, entirely destroyed, were attacked by our avions and by our anti-aircraft guns and came down in the valley of the Saonne, alighting in the region of Sisterton. The crews, after having burned their Zeppelins, attempted to escape but were taken prisoners.

"Two other machines were seen in the south; one landed at Larange, in the lower Alps. The other was seen by the aviation center at Frejus, drifting toward the sea in a vertical position and disabled.

"Thus probably the Germans lost five of their Zeppelins, which were all of the new type, from 234 to 244 meters in length and carrying seven and nine engines, with from 1500 to 2000 horsepower."

Summing up the extent of the disaster to the German air fleet, the report says that Germany altogether has constructed probably 100 Zeppelins, of which 16 were destroyed before the war. The losses officially reported by the Allies were 6 in 1914, 16 in 1915, 25 for 1916, 3 for 1917. Thus the minimum of 66 Zeppelins have been destroyed, to which must be added half a dozen more lost by accident and in experimental trials.

Deducting machines loaned to Bulgaria, Germany now has on the western front only 25 super-Zeppelins. The greatest air fleet concentrated against England in Belgium and northern Germany has never amounted to more than 16 Zeppelins.—*N. Y. Herald*, 24/10.

Germany's Story of Raid on London October 20.—The loss of four Zeppelins is admitted in an official statement received from Berlin. An airship squadron, the statement says, attacked London, Manchester, Birmingham, Nottingham, Derby, Lowestoft, Hull, Grimsby and Norwich, England, with "special success." The statement reads:

"On the night of October 19-20 a naval airship squadron, under Captain Baron Preusch von Buttler-Bradenfels, attacked with special success London, Manchester, Birmingham, Nottingham, Derby, Lowestoft, Hull, Grimsby, Norwich and Mappleton (Middleton?). On the return journey, owing to an adverse wind and dense mist, four airships, under Captains Stabbert, Coolle, Hansger and Schwander, passed over the French battle zone, where, according to French news, they were shot down or forced to land. No details regarding the fate of the vessels or their crews are available at present."—*Washington Post*, 23/10.

BRITISH AIRMEN RAID U-BOAT BASES.—British naval aeroplanes dropped a large quantity of bombs on the Engel aerodrome and the docks at Bruges, in Belgium, on October 19, causing a fire in the German establishments. The text of a British Admiralty statement says:

"On the night of October 19 and the morning of October 20 bombing raids by naval aircraft were carried out on the Bruges docks and Engel aerodrome. A fire is reported to have occurred. Large quantities of explosives were dropped. All our machines returned."

Reporting military operations on the British battle front in France and Belgium, October 19, the British War Office announcement says there was the usual artillery activity on both sides of the battle front.—*N. Y. Herald*, 22/10.

GERMAN RAIDERS ATTACK BRITISH CONVOY.—The Secretary of the British Admiralty makes the following announcement:

"Two very fast and heavily armed German raiders attacked a convoy in the North Sea about midway between the Shetland Islands and the Norwegian coast on October 17. Two British destroyers, his Majesty's ships *Mary Rose* (Lieut. Commander Charles L. Fox) and *Strongbow* (Lieut. Commander Edward Brooke), which formed the anti-submarine escort, at once engaged the enemy vessels and fought until sunk after a short and unequal engagement.

"Their gallant action held the German raiders sufficiently long to enable three of the merchant vessels to effect their escape. It is regretted, however, that five Norwegian, one Danish, and three Swedish vessels—all unarmed—were thereafter sunk by gunfire without examination or warning of any kind, and regardless of the lives of their crews and passengers. Lengthy comment upon the action of the Germans is unnecessary, but it

adds another example to the long list of criminally inhuman deeds of the German Navy.

"Anxious to make good their escape before British forces could intercept them, no effort was made to rescue the crews of the sunk British destroyers, and the Germans left the doomed merchant ships while still sinking, thus enabling British patrol craft, which arrived shortly afterwards, to rescue some 30 Norwegians and others, of whom details are not yet known. The German Navy by this act has once more, and further, degraded itself by this disregard of the historic chivalry of the sea.

"The German official *communiqué* on this subject states that the attack took place within the territorial waters in the neighborhood of the Shetland Islands, and that all the escort vessels, including the destroyers, were sunk with the exception of one escort fishing steamer.

SCENE OF NAVAL ACTION, OCTOBER 17

"The statement as to the locality of the attack is untrue, as is also the statement regarding the destruction of the escort vessels.

"The enemy raiders succeeded in evading the British watching squadrons on the long dark nights, both in their hurried outward dash and homeward flight.

"It is regretted that all the 88 officers and men of H.M.S. *Mary Rose* and 47 officers and men of H.M.S. *Strongbow* were lost. All the next of kin have been informed."—*London Times*, 22/10.

The German Official Report.—"On October 17 light German sea fighting forces in the northern part of the North Sea, within the territorial waters in the neighborhood of Shetland Islands, attacked a convoy bound from Norway to England consisting of 13 vessels, including by way of protection the two modern English destroyers, *G-29* and *G-31*. All the ships of the con-

voy, as well as the protecting vessels, including the destroyers, were destroyed, with the exception of an escorting fishing steamer. Our fighting forces returned without loss or damage."—*Admiralty, per Wireless Press.—London Times,* 22/10.

British and German Sea Fights.—The successful attack by two heavily armed German cruisers on two British destroyers convoying 12 neutral ships, of which nine were sent to the bottom, in the North Sea on October 17, indicates the necessity for a stronger force of warships for convoying duty. The German warships got through the British patrol in the North Sea under cover of darkness, and attacked the convoy about midway between the Shetland Islands and the Norwegian coast. Two British destroyers, the *Mary Rose,* Lieut. Commander Charles Fox, and the *Strongbow,* Lieut. Commander Edward Brooke, which formed the anti-submarine escort, at once engaged the enemy vessels and fought until they were sunk after a short and unequal engagement.

The captain of one of the Norwegian steamships, the sole survivor of that vessel, according to an Associated Press dispatch, said that he ordered his crew into the boats, but the Germans began firing immediately. After the boats were lowered a shell hit one and killed nine men. The crew, in despair, returned to the steamship and signalled to the Germans to cease firing, but their appeal was not heeded. The bridge was then hit and knocked overboard with the captain and rest of the crew. The captain managed to save himself by swimming to a raft, and he was picked up two hours later.

Norwegian newspapers denounce the attack on the merchant steamers in the most bitter terms, referring to it as the most "dastardly deed," and "outrivalling all other German crimes," "an example of German brutality and cowardice," etc.

Swedish newspapers in Stockholm in speaking of the attack say that two German cruisers and three torpedo-boats fired ruthlessly on the merchantmen and subsequently on their life-boats. They made no effort to spare the lives of the seamen. The loss involved in the sinking of the two Swedish vessels according to an Associated Press dispatch amounts to two million kroner ($500,000).—*Army and Navy Journal,* 27/10.

ALLIED DESTROYERS ENGAGEMENT WITH GERMAN DESTROYERS.—A German torpedo-boat destroyer was hit twice by shells from British and French destroyers during a fight, October 27, between six Allied and three German vessels off the Belgian coast, according to an Admiralty statement issued October 29. The three Germans were forced to seek safety under the land batteries. The statement says:

"Six British and French torpedo-boat destroyers, patrolling off the Belgian coast, October 27, sighted and attacked three German torpedo-boat destroyers and 17 aeroplanes. Two direct hits were obtained on one of the enemy's destroyers, which immediately retired under the protection of their land batteries.

"The aeroplane formation was not broken by the fire of the anti-aircraft guns on our destroyers. Each of the aeroplanes dropped three bombs in the vicinity of our vessels, which suffered no damage aside from two men being slightly wounded."—*N. Y. Herald,* 29/10.

LONDON AIR RAID, OCTOBER 29.—Lord French, commander of the British home forces, October 29, announced that the German airplanes which attempted to carry out a raid on the southeast counties of England did no damage and caused no casualties. All the British machines which went up to engage the raiders landed safely.

The text of Lord French's statement reads:

"No casualties or damage were caused by last night's air raid. The enemy machines were unable to penetrate far inland owing to the activity of our own aircraft, which ascended to meet them in spite of the rising gale. All our machines landed safely."—*N. Y. Herald,* 31/10.

BRITISH AIR BARRAGE CHECKED 30 RAIDERS.—The failure of the early morning air raid, November 1, is considered proof of the strength of London's defences. Only three out of 30 enemy airplanes succeeded in penetrating the heart of London.

Their movements showed how completely they were harried. Despite the mist and many light clouds, which gave the invaders an excellent chance of concealment, they were kept continually under observation and forced from their course to avoid the salvoes from the anti-aircraft batteries.

One German plane, having got within the circle of batteries, was driven by heavy fire from one battery after another three times around London before finding means of escape. Most of the other enemy machines either stopped at the coast or were driven back over the suburbs. Their bombs were dropped at random, and any pretence at aiming at military objects was absurd.

Most of the people were abed when the police whistles gave the alarm. There was some hasty dressing and scurrying to lower floors and places of safety, but a majority of Londoners stayed abed and took the raid literally lying down.

Eight persons were killed and 21 others were injured in the German air raid, November 1, according to an official statement issued to-day by the War Department.

About 30 airplanes, in seven groups, took part in the raid, and three penetrated to the heart of London, it is stated.

Apparently the raid was the most elaborate attempt to "lay London in ruins" ever made by the Germans. That this was a failure was due to the new air defences which, with the gunfire of airplanes, harassed the enemy and broke up the hostile squadrons.

The heavy barrage which was put up to protect the metropolis seemed to disconcert the raiders, who dropped bombs indiscriminately, as they approached. Several of these fell upon open spaces, severely shaking little suburban settlements, where there was little or no protection from bombs or the shower of shrapnel.

As the Germans crossed the coast in relays the barrage rose as each relay made its appearance. After the experience of former raids, the public now takes to cover as soon as the warning of an enemy approach is given, with the result that before the guns set up their curtain of shrapnel the streets were deserted except for a few policemen.

A feature of the raid was the appearance afterward of 300 or 400 Boy Scouts as buglers, sounding the "All Clear" signal through the streets. After experimenting with motor horns and whistles, neither of which proved satisfactory, the authorities decided that the French system of bugles was the most effective. The question of where to get buglers was answered by Boy Scouts volunteering in numbers.

Lord French, commander of the home defences, issued this statement on casualties:

"Latest police reports state that the total casualties caused in last night's air raid in all districts were:

"Killed, 8; injured, 21.

"The material damage was very slight, and no damage was done to any naval, military or munitions establishment.

"A large number of our own machines went up. All of them returned safely."

A detailed account of the raid says:

"Determined and repeated attacks were made upon London, November 1, by groups of hostile aircraft. The first group of raiders crossed the Kentish coast at about 10.40 p. m. and proceeded toward London over Kent. They did not penetrate far inland, however, but turned in an easterly direction and dropped bombs at various places in and near the coast.

"Meanwhile two more groups of raiders were steering toward London along the south bank of the Thames. The sky was half to three-quarters

covered with thin, low clouds which rendered extremely difficult observation of the enemy machines. Nevertheless their altitude was correctly calculated and they were broken up by barrage fire on the southeastern outskirts of the metropolitan area at about 11.50 p. m., where some bombs were dropped.

"The fourth group of machines, which came along the Thames estuary, was turned back about halfway to London.

"Meanwhile the fifth group crossed the Essex coast at about 12.15 a. m., and steered toward London by way of the north bank of the Thames. Some of these raiders were turned back by the outer defences, but one or more penetrated into southeast London, where bombs were dropped.

"The sixth group, followed along the same course about a quarter of an hour later. Some of these machines penetrated into the southeast outskirts of London, where some bombs were dropped. Meanwhile one or more enemy machines dropped bombs in the southwestern outskirts of London. The seventh group, which approached along the south bank of the Thames, was dispersed by gunfire before reaching the outer London defences.

"In addition, individual raiders attacked the Kentish coast between midnight and 1.30 o'clock.

"Reports indicate that each group consisted of three or four machines, the total number of raiders engaged being about 30. Of this total only about three machines succeeded in actually penetrating into the heart of London. The raiders were harassed by our gunfire during the whole of their flight, and were also attacked by our aircraft. The facility with which they were able to escape observation by taking advantage of the clouds prevented any decisive engagement."—*N. Y. Times*, 2/11.

BRITISH DESTROYERS ENGAGE GERMAN CRUISER AND TRAWLERS.—Thirty men on the German auxiliary cruiser *Marie of Flensburg* were killed in an engagement with British destroyers, according to an Exchange Telegraph dispatch from Copenhagen.

The *Marie*, a 3000-ton vessel, met the British destroyers 12 miles north of Kullen. She immediately opened fire, which was answered by the destroyers. In ten minutes the *Marie* was ablaze.

Of the 81 members of her crew, the dispatch says, 30 were killed and the others took to the boats. Seven wounded sailors subsequently were rescued by the Danish steamship *Dalgas*. Another man was picked up by the steamship *Trondhjem*. The other members of the crew are believed to have been rescued by the destroyers.

It is understood that the *Marie* was accompanying a number of patrol boats, including the *Crocodile*, which sank after an explosion.

An official statement issued by the Admiralty says that ten armed patrol craft, in addition to the German auxiliary cruiser, which was equipped with 6-inch guns, were destroyed.

The statement issued by the British Admiralty says:

"Further reports from our forces operating in the Cattegat have been received. We destroyed a German auxiliary cruiser armed with 6-inch guns and we also destroyed ten armed patrol craft. Sixty-four prisoners have been rescued by our forces. No British losses have been reported."

According to the Copenhagen correspondent of the Central News, the German vessels were displaying no flags. When the British signalled them to show their colors the German cruiser opened fire, at the same time breaking out the German ensign. The bodies of many Germans have already been washed ashore on the Swedish coast.—*Baltimore Sun*, 4/11.

CRUISER ACTION OFF HELIGOLAND.—British light forces engaged German light cruisers off Heligoland, the British Admiralty announced, November 17. The German warships retired and the British forces are now chasing them.

The announcement follows:

"British light forces operating in Heligoland Bight have been engaged with German light forces this morning, November 17. The only information we have received thus far is that our vessels have engaged enemy light cruisers, that the latter have retired at high speed, and that our vessels are in pursuit."

It is not likely that any details of the naval engagement will be received until the British ships return to port, as it is not customary for them to send wireless reports of their movements and actions while close to the enemy bases.

On a few occasions when British cruisers, which constantly are sweeping the North Sea, have been able to encounter German war vessels the enemy's tactics have been of the hit and run character. They hurry toward home with the purpose of trying to bring the British into their mine fields and, if possible, under fire of the large land guns.

The bare facts embodied in this official bulletin from the British Admiralty indicate that in this engagement the Germans followed their usual tactics.—*N. Y. Times,* 18/11.

TWO U-BOATS SUNK BY BRITISH PATROLS.—An account of the sinking of two German submarines by British patrols off the Shetland Islands, is printed in the Norwegian newspapers. The *Aftonpostens* dispatch says:

"An armed patrol ship has arrived at Lerwick in the Shetlands with five or six German prisoners. The ship one morning came suddenly upon a U-boat which was in the act of sinking a sailing ship. The periscope of the submarine was smashed with a shot, and the U-boat began to sink. At that moment another U-boat appeared and fired two torpedoes at the patrol, but both missed.

"Meanwhile a destroyer arrived on the scene, and was fortunate enough to make a square hit on the second U-boat. Only a few survivors could be picked up."—*N. Y. Times,* 8/11.

BALTIC

GERMANS TRAP RUSSIAN SHIPS IN RIGA GULF.—The Germans have taken 10,000 prisoners and 50 guns on Oesel Island, the War Office reports.

The Russian naval forces in the Gulf of Riga have been trapped by the Germans, according to the announcement. It says German naval units are lying in the eastern portion of Kassar Bay, north of Oesel Island, and are barring the passage westward.

Portions of the German naval forces pressed forward through the mine field in the Gulf of Riga to the southern exit of Moon Sound. The statement says there was a short engagement with about 20 Russian warships, which later retired to Moon Sound.

The text of the statement reads:

"Reclassification of the booty captured on Oesel Island has up to the present given the following result: Ten thousand prisoners from two Russian divisions—only a few hundred men escaped to Moon Island; 50 guns, including some undamaged heavy coastal and field batteries, numerous arms and other war material.

"Portions of our naval forces pressed forward through the mine fields in the Gulf of Riga to the southern exit of the great Moon Sound, whither about 20 Russian warships retired after a short engagement. The Russian batteries near Woi, on Moon Island, and on the Esthonian coast near Werder Island were silenced.

"Other of our naval units are lying in the eastern portion of Kassar Bay and are barring the passage to the west.

"Between the Dvina and the Danube there were no notable military operations, the only activity being some fruitless attacks by Russian scouts."—*N. Y. Herald,* 19/10.

GERMANY'S BALTIC VICTORY.—The following article by Arthur Pollen appeared in the *New York Times*, October 20:

When the news first reached us on October 10 that there had, six weeks before, been something like a mutiny in the German fleet, I suggested in the columns of *The New York Times* that the Higher Command would have no difficulty in restoring the morale of the German Navy, and, to make assurance doubly sure, would probably send the fleet out to fight without delay. On Friday, the 12th, the attack on the Island of Oesel began. By the following Tuesday night the entire island was in German hands, as well as the neighboring Island of Dagö. By Wednesday the Dirben Channel had been swept clear of mines, and at least two German dreadnoughts had entered the gulf, and on Thursday evening we heard the news that the *Slava* had been sunk, that all the Russian naval forces had been driven into Moon Sound, and that the northern and western exits from the sound were blocked by superior forces. In less than a week, then, the Germans have won complete naval mastery of the Gulf of Finland, and can now establish bases for an advance on Reval and Petrograd at Hapsal and Pernau, as well as at Riga.

These are events literally of a portentous character. They reveal a state of things partly entirely unsuspected, partly only feared, but not known for certain. They promise consequences of a very grave order indeed. They prove the German Higher Command to possess a far better understanding of the tactics of combined operations than we had any reason to suspect. In spite of the gallantry of the Russian defences and of the splendid fight put up by the *Slava*, they confirm our worst fears as to the confusion into which the Higher Naval Command has fallen in Russia, and afford a solid basis for supposing that the Baltic fleet is very far from having recovered from the events of last March and the continuous revolutionary interference with the sailors that has persisted since. The victory puts Germany into position for a successful drive on Reval and Petrograd next spring, if, when next spring comes, she has the forces necessary for this very considerable operation. Finally, as in 1915 and 1916, the German Government is able to hearten its people to endure the hardships of the winter by the news of great success. Let us take these points in order and deal with them briefly.

The events of last week afford us the second example, since August, 1914, of what are not very happily called "amphibious" operations. They afford the first example of completely successful amphibious operations. The other, of course, was the British attempt to send a pre-dreadnought fleet into the Sea of Marmora through the Dardanelles. A comparison of the two operations is instructive. The war council, over which Mr. Asquith presided, was persuaded to initiate the Dardanelles attack on the assurance of the British Admiralty, represented by Mr. Churchill and Lord Fisher, that the operation could be carried through successfully by the employment of naval force alone. Lord Kitchener gave a reluctant consent to it on this understanding. The objective was to get the British fleet of pre-dreadnought ships from the Mediterranean into the Sea of Marmora through 50 miles of narrow channel, in one place little more than half a mile, and for the most part from 2 to 5 miles wide. This channel was defended by 2 or 3 almost negligible forts at its mouth, and by a very formidable group of forts extending for 3 or 4 miles on each side of that portion of the channel which ended in the gut opposite Chanak. It is at this point that the width is less than 1000 yards. All the area leading up to it was heavily mined, and the actual narrows were fortified by torpedo tubes placed, like those in a ship, below the surface of the water, and therefore not exposed to the artillery of any vessels attempting to pass them. The ships, therefore, had three obstacles to overcome: mine fields—which must be swept before the ships could advance, but completely covered by the heavy guns of fortresses and by field and howitzer batteries especially constructed for their defence;

the forts themselves—which were in many cases built for indirect fire and so were out of sight of the ships that had to engage them; and torpedo attack directed from positions that could not be destroyed by gun fire. The attack was very gallantly made and pressed on many occasions for over a month. The outer forts, where observation at right angles to the line of fire was possible, fell after a very brief bombardment. But the complicated problem of dealing with the mine fields and the forts was found to be insoluble.

The naval attempt having failed, an army was landed two months after the first attack by ships had been made. But this attack had put the Turks and their German leaders on their guard, and every possible landing place on the peninsula was defended, not by the kind of fortifications which the experience of six months of war had shown to be obsolete, but by a skillful combination of trenches, machine-gun emplacements, barbed wire and field guns, that promised to make any sort of landing at all an absolute impossibility. It will always remain one of the glories of the British arms that these obstacles were triumphantly overcome. But if sheer fighting ability had made the landing possible, an advance to the conquest of the peninsula was impossible. Two months of defensive preparation had done their work, and the naval failure was followed by the military disaster which that failure had made inevitable.

The origin of the blunder, as well as its character, had been made obvious before the commission appointed to inquire into these events made their report. In every warlike undertaking singleness of purpose and unity of command of all the means necessary for obtaining it are of the essence of the matter. Both of these were lacking in our enterprise against the Turks in 1915. What could only succeed as an amphibious or combined operation was not perceived to be an amphibious operation at all. First came the naval effort, then, when too late, the military attempt to redeem it.

The Germans have proceeded very differently. Just as the British objective was to get an enormously powerful naval force into the Sea of Marmora, the German objective was to get a dreadnought force into the Gulf of Finland. Dreadnoughts can enter this gulf only by the Dirben Channel, which, for the greater part of its length, is under the fire of the guns situated at the end of the southern promontory of the Island of Oesel. The whole of this channel, a week ago, was heavily mined, and sweeping them up was clearly a mighty perilous proceeding until the guns commanding the mine field were silenced. The task set to the Germans was, obviously enough, a far simpler one than that propounded by Mr. Churchill 2½ years ago. But mark how they have set about it. First, they proceeded to drive all Russian light craft which were outside the islands to the cover of their forts and mine fields. They then opened bombardments on Oesel at several points, and landed not only very large forces, but highly mobile forces. We hear of whole regiments mounted on motor bicycles. In 3 days Oesel was overrun, and, no doubt, advanced observation stations were established to direct the fire of the ships' guns on to the Russian positions. Nothing has been said of artillery having been landed, and it is quite possible that it was unnecessary, once the ships' artillery had, in this manner, been made efficient for its purely military purpose of enabling the infantry to rush and take the forts after they were destroyed. The first attempt on the Island of Dagö seems to have been a failure. But the taking of Oesel seems to have gone through without a setback, and now Dagö and Moon have fallen, too. With the destruction of the last forts, the position with regard to sweeping the mine fields was reversed. What the German Navy could not do under the threat of Russian land fire, Russian naval forces could not interfere with when under the menace of these same guns in German hands.

The Germans, in short, realized that possession of the mine field followed possession of the forts. The tactics of the Dardanelles were reversed. A purely naval objective was won by the employment of almost purely military

means. Instead of the fleet making the army's task impossible, it was the army that made the fleet's task easy. So much for the general character of the operation.

Now it is a pertinent question to ask why this operation was not attempted long ago. In August, 1915, the Germans tried to deal with the Gulf of Riga just as, in fact, we tried to deal with the Dardanelles. They attempted, that is to say, to get naval command by means of naval force only. After two attempts to clear the mine fields had failed, a third and successful effort was made during a fog. So long as visibility was good the old battleship *Slava*—which has now fought her last fight and has sunk gloriously—could keep the German mine sweepers under fire while herself out of range of the German battleships beyond the channel. But in the fog her guns were useless, and the German light craft entered. But they had not time to sweep a channel wide enough for the pre-dreadnought battleships, and the enemy committed the folly of attempting to engage the Russians without battleship support. The result was disastrous; the barges, towed in laden with infantry for an attack at Pernau were sunk wholesale, and the German forces were driven out discomfited and defeated by the Russians. The Germans may be fairly slow-witted, but it is probable that even in August, 1915, the lesson of the Dardanelles had gone home. Why, then, was the seizure of Oesel by a combined operation from the Baltic side not attempted then? The Germans forbore out of deference to the well-known naval doctrine of the "Fleet in Being." The doctrine is roughly as follows: No naval oversea operation which can be brought to ruin by the attack of a hostile fleet can be entered upon while the hostile fleet is still undefeated and integral. It is a doctrine that in fact, as well as in theory, can be shown to have only a limited, and, indeed a very limited, application. But it possesses validity in certain cases, and this was one of them. The situation was as follows:

In 1915 the Russian Baltic fleet could bring a broadside fire of between 50 and 60 12-inch guns into action. It was known to possess possibly the highest standard of gunnery of any fleet in the world, was full of enthusiasm and under the control of a generation of naval officers on whose minds the humiliations and lessons of the war with Japan had set their imprint. Just as the first British Army—that fought from Mons to Melun and back again to the Aisne, and then in the enemy's great drive for Calais, with an incredible tenuity of line, held back German forces reasonably supposed to be overwhelming—was a force disproportionately strong for its numbers and owed its strength to what had been learned in the Boer war, so, too, the Russian pre-revolutionary fleet was rightly estimated as the most perfect naval force of its numbers then in existence, owing to its being the only European navy with war experience. It was doubtless a force greatly inferior in numbers and material to that at the disposal of the German Higher Command. But no superiority of numbers could have made its defeat a cheap victory for the Germans. Now, had the Germans in 1915 attempted to master the Gulf of Riga by way of the amphibious operations just carried out, it was virtual certainty that the Russian fleet would have forced a battle in the Baltic, and this would have put Germany into a dilemma. The pre-dreadnoughts would not have engaged the Russians at all. She must either, therefore, refuse battle and leave her forces on Oesel to the mercy of the enemy, or give battle with the High Seas fleet and risk the destruction of perhaps a third of her dreadnoughts before the Russian fleet could be brought under. The latter was a risk that certainly could not be faced. In 1915 the Germans had not abandoned all hope of lowering the strength of the British fleet, by mines and submarine attrition, to a point at which a victory at sea might be possible. And she still had to keep her fleet to save her own coast from invasion.

That she has proceeded on a different principle now seems proof positive that she does not regard the Russian fleet as any longer "in being." The revelation is not encouraging. Those that know Russia best have the

highest hopes of the resuscitation of her naval and military strength. No one who knew the Russian Navy before the war can reconcile himself to the belief that it is not an immensely powerful force still, and, without being the wonderfully efficient thing it was, it may yet put up a powerful fight. But it is ominous that it has not been used as the first defence of the capital.

It seems very doubtful if Germany can put this victory to any early military profit. Perhaps, as I have already suggested, its immediate value in buttressing the morale of the German people and in restoring the morale of the German Navy will prove at once of the greatest, possibly its only, value. At first sight it must seem as if it should have a correlative profit for the victors in the depression of their enemy. But we must remember that the greatest of all the factors that make for Russian weakness, the imbecile interference of the anarchists with the government and the forces, is infinitely the most grave. If Petrograd has to be evacuated and the modern Jacobin Club broken up as a political force, the advantages to Russia, and hence to the Allies, may be incalculable. It is, in fact, more than possible that the latest German victory will prove to be the last.—*N. Y. Times*, 20/10.

RUSSIAN NAVAL ENGAGEMENTS.—Two German dreadnoughts, 1 cruiser, 12 torpedo-boats and 1 transport were put out of action by the Russians in the fighting around the islands in the Gulf of Riga, but the ultimate fate of some of the ships is unknown, says an official statement issued last night by the Russian Admiralty.

The Admiralty staff in its review of the fighting says that the Russian units fought excellently against the superiority of the Germans. The statement reads:

"During October 21 important enemy naval forces, together with transports, were sighted by our outposts in the Gulf of Riga. In Moon Sound the enemy seems to be clearing the water of obstructions which we laid down. There was no naval action during the day, but enemy submarines were discovered in the Gulf of Finland.

"As the naval operations in the Baltic Isles have now ended, it is possible to review them. The task of our fleet in this region was, with the organized position of Moon Sound as a base, to prevent enemy attempts to seize the Gulf of Riga and Moon Sound. So long as the German fleet only employed in such an operation elements of minor importance, as in 1915, namely, two dreadnoughts, our naval forces could cope with them.

"In 1915, although our position in Moon Sound was organized incompletely, we repulsed successfully all attacks, and the enemy, during three days' possession of the Gulf of Riga, suffered losses so grave that he was obliged to depart. A similar attempt in 1916 with unimportant forces failed completely.

"In the recent operations the enemy employed the major part of his fleet, and his overwhelming superiority enabled him to carry out debarkation rapidly and successfully. Our fleet only was able to do its best to hinder these efforts and to inflict maximum losses. With this object, we delivered a series of attacks, using all the naval resources in our possession.

"As a result of these operations the enemy lost through mines, submarine attacks and artillery fire 2 dreadnoughts, 1 cruiser, 12 torpedo-boats, 1 transport and numerous mine sweepers, all of which were put out of action. Their ultimate fate is unknown.

"We have established the actual loss only of six enemy torpedo-boats, two of which were of the small type and were sunk by gunfire from our position on Moon Island. The other torpedo-boats were sunk in combats or blown up by mines. The wreck of the torpedo-boat *T-69* is visible on a sand bank in Kassar Bay. Further, our coast batteries sank four enemy torpedo-boats.

"Our losses are the ship of the line *Slava* and a large torpedo-boat destroyer of the *Grom* type. The efficiency of our other ships has been maintained completely."

German torpedo-boats of the *T-69* class were built in 1891, displaced 145 tons and had a complement of 16 men. They are 154 feet in length.—*Baltimore News*, 23/10.

GERMAN PROGRESS ON RIGA GULF COAST.—The German forces have completed their occupation of the group of islands off the Gulf of Riga and have made a landing on the Russian mainland to the east, but while their land operations have here met with success, their efforts to cut off the Russian Riga fleet have not led to the result that they might have hoped. The Russian vessels, after retiring before the enemy sea force through the Gulf of Riga entered the passage between the islands and the Esthonian coast, to the east, and moved north toward the Gulf of Finland, where they had a chance to run eastward to the Russian naval base at Kronstadt.

The occupation of the islands, to which the German command apparently gave its chief attention, has been completed by the seizure of Mohn (usually called Moon) and Dagö islands, and the smaller island of Schildau between Mohn and the mainland. A force under Lieutenant General von Estorff, according to the Berlin reports of October 19, passed from Oesel to Mohn Island early on the preceding morning, by way of the connecting mole and in boats. About 5000 Russian troops, defending the island were soon overcome, and by noon of the same day the Germans were in complete possession, having made the 5000 Russians prisoners. The German fleet, approaching by way of the Gulf of Riga, engaged the batteries of the island and the Werder Peninsula, on the opposite shore, and apparently overcame them.

On the following day a German military force landed on the south shore of Dagö Island at landing points previously secured by German naval parties. Only 1200 Russian troops were taken on Dagö, according to the first count. The island, about half as large as Oesel, was occupied without delay. In all, Berlin reported, over 20,000 prisoners and 100 guns fell into the Germans' hands with the islands.

On October 21 German troops seized the Werder Peninsula, a salient point of the Esthonian coast directly east of Mohn Island, and 25 miles south of Hapsal. At this point they were within about 275 miles of Petrograd, and the news of their apperance there caused much misgiving among the Russian authorities, leading to the announcement of preparations for the removal of the government to Moscow. The likelihood of other landings on the eastern Riga Gulf coast was apprehended at the Russian capital and increased the uneasiness. It was evident that the moral effect of the Riga Gulf operation on the Russians was likely to give the success a greatly increased value to Germany.

The German naval forces had been largely engaged in shelling coast points, seizing landing places for the use of the military arm and guarding the heavily laden German transports. This may account, in part, for the fact that the Russian Riga Gulf squadron, retiring after its engagement with the German warships off the western extremity of Oesel Island on the 14th, was not more closely pressed. Gaining the passage to the east of the islands, the fleet of Admiral Bakhireff enjoyed the advantage of being able to sally either to the north into the Baltic or into the Gulf, to the south, choosing the direction opposite to the approach of the main German naval force. To head the Russians off in both directions and at the same time to cooperate with the German land forces would have required an overwhelming naval superiority, greater perhaps than the German fleet possessed. The Russian battleship *Slava* is reported by Petrograd to have been sunk in the southern end of the passage where the Russian fleet retired, impeding any attempt on the Germans' part to enter. Instead of making the attempt, the Germans strewed mines, according to Petrograd, closing up the southern passage and protecting the landing force destined for the Werder Peninsula from attack on the water. Bakhireff thereupon moved northward, apparently headed toward the Baltic. Russian accounts

of the sea fighting of October 14 and the days that followed assert that as many as 16 German vessels including one or more German dreadnoughts were sunk or seriously damaged. A British submarine, it was also asserted, cooperated with the Russians and torpedoed a German warship. A German attempt to land at a second point on the Esthonian mainland, at Tomba, south of Werder, was defeated on October 24, according to Petrograd.—*Army and Navy Journal*, 27/10.

NAVAL ACTION IN GULF OF RIGA.—The naval action in the Gulf of Riga, on October 14, bears a close resemblance to the fighting which took place in the same waters some two years ago, when a German attempt to effect a landing in the Gulf was foiled. On that occasion, as on this, Russian gunboats and destroyers were engaged with strong enemy forces, which included several capital ships. In the action of October 14, the brunt of the fighting was borne by the gunboats *Khrabry* and *Khivinetz*, and four destroyers. The *Khrabry*, launched in 1895, is of 1740 tons, has a speed of 14 knots, and is armed with two 8-inch, one 6-inch and many smaller guns. The *Khivinetz*, launched in the same year, is somewhat smaller and slower, and carries only two 4.7-inch and eight 12-pounder quick-firers. The four destroyers named in the Russian *communiqué*, viz., *Grom*, *Zabiaka*, *Pobieditel* and *Konstantin*, all belong to a homogeneous group of 36 boats authorized in 1912, the design of which was based on that of the *Novik*. They are 321 feet in length, and displace 1350 tons, and were designed for a speed of 35-36 knots. The armament consists of three 4-inch Q. F. and ten torpedo tubes mounted in pairs on deck. The fact that this small squadron endured the fire of a German dreadnought, with the loss of only one destroyer, does not say much for the accuracy of the German gunners.—*The Engineer*, 26/10.

HEROIC FIGHT BY "SLAVA" AGAINST HEAVY ODDS.—Detailed accounts are now at hand of the last days of the battleship *Slava* and the fighting on Moon Island.

Members of the *Slava's* crew state that on October 17 it was reported from Werder that the enemy fleet was approaching the southern entrance of Moon Sound. The Russian squadron was in fighting order, and at once raised anchor and steamed out to the mine fields. At a range of 112 cable lengths the Russian ships opened fire.

The German dreadnoughts, under cover of a smoke curtain, rapidly advanced, and a fierce battle began. The Russians hit the bow of the leading German dreadnought, while the *Grazhdanin* and the *Bakyan* were struck by the Germans, but not seriously damaged. Ultimately, the enemy fire was concentrated on the *Slava*, which, having received several 14-inch shells in her starboard bow, began to heel over.

In addition to the continual fire from the enemy ships, the *Slava* was attacked by five seaplanes. The officers and crew worked with perfect harmony and magnificent energy. Finally the ship was righted, but in view of the great superiority of the enemy orders were given to retire, and the squadron slowly steamed northward, with the *Slava* in the rear, exposed to the full force of the enemy's fire.

Water gradually filled her hold, and she slowly sank. Destroyers came up and took off the surviving officers and men, and the *Slava*, whose name means glory, went to the bottom with her heroic dead. The sailors had fought marvelously.

Some volunteers from the *Slava* landed on Oesel Island to defend it, and for hours held the mole between Oesel and Moon Island. Infantry, however, betrayed them. The sailors begged the soldiers to do their duty. "It doesn't matter when you die, comrades," they said. "It's a shame to give the island to the enemy." The soldiers refused to listen, and hurried across to Moon Island.

The sailors say that if the soldiers of the garrison had not been so cowardly the Germans could have never landed troops on the island. To prove this, they point out that the *Slava* sailors, with a volunteer detachment from Revel, in all 600 men, fought 6000 Germans, and drove them back 14 miles.

The seaman were greatly incensed at the brutal treatment of wounded sailors and prisoners by the Germans. When the volunteer battalion drove back the Germans on Oesel Island they found one sailor lying with his eyes gouged out and four other seamen mangled.

It has long been a puzzle to students of German naval strategy that the enemy has neglected his opportunities in the Baltic. The naval force he has now brought to bear is probably five times superior to that of the Russians and its applications at any earlier stage of the war might have yielded important results. It is asserted that the third, fourth and fifth squadrons of the German high seas fleet are now in the Baltic with 10 or 12 light cruisers, and from 60 to 80 destroyers, besides smaller craft. So far the Russians have opposed to this only Admiral Bakhireff's little squadron of comparatively old ships. The defence of the North Sea seems to have been left mainly to the new German submarine fleet.

The Germans may now secure command of the Baltic, destroy the work of Peter the Great, and thus have a further weighty argument at the peace conference, but the further development of their success depends on a proper combination of land and sea forces. There is no evidence that they have a large land force at their disposal. It is true that in 12 transports they brought up the 42d division to capture Oesel Island, but at the same time they transferred at least three divisions from Riga to the western front.—*N. Y. Times,* 27/10.

SAID BRITISH FLEET COULDN'T REACH BALTIC.—The passage in the interview of Premier Kerensky, recently given to The Associated Press, which has aroused the greatest interest in London was his inquiry as to why the British fleet had not been sent to the Baltic Sea.

A detailed discussion of that question was presented by Sir Eric Campbell Geddes, First Lord of the Admiralty, in his speech before the House of Commons, November 1, the same evening that Kerensky talked with the correspondent.

Sir Eric, referring to those critics who had asked why the British fleet had not been sent into the Baltic, remarked:

"I am very doubtful whether any of those critics have studied with care a naval chart of the entrance into that sea. I am of the opinion that they formed their views after looking at a schoolboy's atlas in which all the sea is colored pale blue."

Continuing, he said in part:

"Before the Germans attempted operations in the Gulf of Riga, they deemed it necessary to occupy the islands commanding the entrance to the Gulf. The islands, which command the entrance of the Baltic, belong to a neutral power, Denmark. Would it not be an act of madness for the British fleet to pass through into the Baltic with the certainty that the Germans would occupy and fortify those islands in our rear?

"If we did pass through, should we find the German fleet there on our arrival? The operation of passing through would occupy a considerable period of time as, putting aside the question of neutrality of the Danish Islands, there are extensive mine fields to be cleared.

"Also, the leading vessels of our fleet, debouching from the Great Belt (the only possible passage) in a necessarily deep formation on a very narrow front, would find the whole German fleet deployed and concentrating its fire on them. I have found no responsible navy officer of any school who would support such an enterprise to-day.

"I do not touch upon such questions as those of the line of communications to be maintained with the fleet once in the Baltic and the fact that

every supply ship passing through would do so within 30 miles of Kiel. It is certain that only a small proportion would succeed in getting through unless a heavy force were detached to protect them.

"Our fleet in the Baltic, if it got through, would soon wither to impotence with its vital communications cut, and our Russian ally could not supply it with fuel, ammunition, or stores."—*N. Y. Times*, 4/11.

BALTIC IS BARRED TO BRITISH.—The following article by Mr. Arthur Pollen appeared in the *New York Times*, November 11:

The British Admiralty has been rather severely criticized in the last few days, not only by the English and American press but by the Russian Premier, Kerensky, for its failure to send a fleet into the Baltic sufficiently strong to save the Gulf of Riga from German occupation. It appears to me that there is a considerable element of injustice in this criticism, for the following reasons:

The entrance to the Baltic, like the entrance to the Gulf of Riga or the Sea of Marmora, is commanded by land positions. Denmark and Sweden could either of them make it impossible for a fleet to go through the Sound or the Great or Little Belt. Unless the land positions governing the sea passage were in the military occupation of the power whose fleet it was intended to pass through, neither the passage nor the fleet's communications would be secure.

If we were assured of the absolute neutrality of Sweden and Denmark, and could accept this assurance to mean that the enemy's torpedo and mine-laying craft would not be allowed in the territorial waters of either power, and if conditions were such that we could believe that both powers were not only willing but, what is much more important, able to defend their neutrality against the enemy, then sending a fleet into the Baltic might be regarded as a purely naval affair. But to accept these assurances is to suppose that the enemy would refrain from invading Denmark and cutting off the fleet once in the Baltic from communications with England—which, of course, is absurd.

The plain truth of the matter is that no fleet could be sent into the Baltic without either having Sweden and Denmark in active military alliance with us, or compelling them to accept our military occupation of all the commanding points, which would carry with it an undertaking on our part to protect them absolutely from the enemy. Before any Baltic adventure could be considered, then we must first settle the enormously complicated problem in statesmanship involved in violating Swedish and Danish neutrality, either by agreement or by force, and then the not less complicated military problem of securing by military means the communications of the fleet.

The naval problems involved in the actual passage and maintaining a fleet in the Baltic are considerable enough. But let us remember that before this comes up for solution the political and military problems must be dealt with. To throw the blame for failure to help in the Baltic entirely on the British Admiralty, therefore, is hardly just to that much-criticized body.

The small engagement in the Cattegat, reported in to-day's telegram from London, is enormously interesting and important. It is not, of course, by any means the first engagement which has taken place in these waters, but it is, so far as I know, the first time that destroyers, armed with 4-inch guns, have engaged cruisers, armed with 6-inch guns, and got the best of it. The full details of this engagement should be exceptionally interesting. The accounts available are rather confusing. Two different cruisers are named as having been sunk—one of 3000, the other of 1000 tons displacement. The official cable mentions only one—and does not state the size.

But the significant thing is the armament. In the North Sea raid on the convoy a week ago, there were two of these cruisers against two destroyers, and the destroyers were lost. This time the tables are turned. It looks like a singularly brilliant piece of work.

ADRIATIC

AUSTRIAN NAVY LEAGUE DEMANDS EASTERN ADRIATIC,—Information has reached Washington through diplomatic channels that the Austrian Navy League has adopted resolutions setting forth its views regarding peace terms and taking the position that above all things peace must provide Austria with the possibility of developing the Adriatic and the Danube and of obtaining political and commercial freedom and unhindered contact with the near and far east.

Reciting these Austrian aims the dispatch received here to-day says:

"Avlona must not remain in Italy's hands. If Albania and Montenegro are to continue to exist as states, Austria must be guaranteed the necessary influence from Spizza to Avlona, and the right to have military stations at the most important points, viz., Antivari, Dulcigno, San Giovanni, Durazzo and the north of the Bojana. Albania and Montenegro can only be permitted to continue to exist as states on condition that they enter into close economic and military ties with the monarchy.

"Lovcen must forever remain Austrian. Trieste and the hinterland connected with it must be rendered secure from all danger. The Danube at Belgrade must become altogether an Austro-Hungarian possession. Thence it follows that the entire right bank of the Save with Belgrade must be assigned to Austria, as well as the entire right bank of the Danube as far as Smederevo.

"If Serbia is to continue to remain a state, she must not be allowed to own more than a small stretch of the Danube near Smederevo. Neither Serbia's nor Rumania's frontier can be allowed to touch upon the Iron Gate. If Serbia and Rumania are to continue to exist as states it can only be upon condition that they receive rulers who will not be hostile to Austro-Hungarian interests, and that they will be prepared to conclude military and economic treaties of long duration with Austria."—*N. Y. Times*, 27/10.

ITALIAN NAVY IN GULF OF TRIESTE.—A naval bulletin, November 3, referred to intense activity in the Gulf of Trieste. In this connection it may be pointed out that, while attention is chiefly fixed on the two land fronts in Venetia and the Trentino, yet the authorities are not overlooking the fact that the navy has a sea front on the Adriatic which many experts believe is the key to the whole situation in the Austro-Italian war theater.

This front has undergone a sweeping change within the last few days, as the withdrawal of the Italian Army to the new front west of the Tagliamento River brings the enemy into a long stretch of the upper Adriatic extending along the Gulf of Trieste from Monfalcone to the mouth of the Tagliamento.

The Italian Navy in the Adriatic, under command of the Duke of the Abruzzi, captured the important naval strategic point of Grado and its vast lagoon, thus effecting occupation by the Italian naval forces of the entire gulf front for 25 miles up to Monfalcone, whence they looked out upon Trieste as the great prize of the upper Adriatic, only a few miles away.

These facts give significance to the present intense activity in this quarter of the upper Adriatic, as it has been suggested that the naval front may yet become the turning point in the present titanic struggle. It is the view of the naval authorities that the Entente would do well to consider quickly and thoroughly the naval possibilities of the Adriatic, as it is maintained that it offers one of the surest fields for the Entente to deal a decisive blow.

The basis for this is that Austria cannot possibly receive naval reinforcements from Germany, as all the sea routes are controlled by the Entente, whereas these routes are open to permit the Entente to assemble a fleet which would make the reduction of the Austrian fleet a certainty.

The chief reliance of the Austrian Navy is in keeping its big ships under cover, and thus far no important unit has been destroyed; yet, with the Entente fleets reinforcing the Italian fleet in the Adriatic, naval experts

say that hydro-airplanes could drive the Austrian ships from their hiding and bring them within range of the combined Entente fleets.

Once the Austrian fleet was destroyed, it is pointed out, Austrian mastery of the Adriatic would disappear, as the whole range of the coast, including Trieste, would be under control of the Italian and other Entente fleets.—*N. Y. Times*, 5/11.

BLACK SEA AND TURKISH WATERS

RUSSIANS DESTROY TURKISH TORPEDO-BOAT.—In an attack on Turkish vessels in Inada Bay, in the Black Sea, near the Bosporus, Russian torpedo-boats sank a Turkish torpedo-boat and destroyed two Turkish steamers and a naval battery in the bay.—*N. Y. Times*, 2/11.

BRITISH AVIATORS RAID CONSTANTINOPLE.—During a recent air raid over the Gallipoli Peninsula and Constantinople by British naval aviators, the former German cruiser, *Goeben*, now the Turkish warship *Sultan Selim*, was hit, it was officially announced to-day.

A vessel named the *General*, and reported to be the German headquarters at Constantinople, was twice hit by bombs the raiders dropped. Two hits also were obtained upon the Turkish War Office.—*The Baltimore News*, 16/11.

U. S. ARMY NOTES

MAJOR GENERAL GOETHALS HEADS WRIGHT-MARTIN COMPANY.—On October 3 Major General George W. Goethals was elected president of the Wright-Martin Aircraft Corp. He will take at once an active part in directing the corporation's affairs in an advisory capacity.

Since his retirement as general manager of the Shipping Board, General Goethals has been engaged chiefly in undertakings of his engineering firm, Goethals, Jamieson, Houston and Jay, 40 Wall Street, New York.

General Goethals's election as a director of the Wright-Martin Corp. occurred at the annual meeting of shareholders. When the other directors decided to make him president, he accepted with this statement:

"I have seriously considered and discussed my acceptance of the position to which you have elected me, and I have accepted it with the view of doing some work that will be useful and assist in the prosecution of the war. My acceptance is from a sense of duty, and for such time as I can be helpful, or during the war period."

George H. Houston, a partner of General Goethals, is to continue as vice-president and general manager of the Wright-Martin Corp. Marshall J. Dodge, of Bertron, Griscom and Co., was elected a director and the retiring members were re-elected for another year.

The Wright-Martin Corp. recently obtained a large order from the government for Hispano-Suiza airplane engines. The output of the Wright-Martin plant at New Brunswick, N. J., is to supplement the government's production of Liberty engines to equip the airplanes now in process of construction. The company a year ago engaged to build 450 Hispano-Suiza engines, in part for the French Government, and is still at work upon them.

The annual statement says that as soon as the last of the engines shall be completed, which will be in a few weeks, the full plant capacity is to be devoted to United States Government work.

General Goethals's achievement as the builder of the Panama Canal is known and recognized throughout the civilized world. He was appointed a member of the Isthmian Canal Commission, March 4, 1917, by President Roosevelt. He arrived on the Isthmus March 12 following, and on April 1 the President placed him in complete charge of the work as chief engineer and chairman of the Isthmian Canal Commission.

From that date the dirt began to fly. Completing the work ahead of schedule and for several million dollars under the estimate of $375,000,000, on April 1, 1914, the c onstruction organization went out of existence and General Goethals made the first governor of the Panama Canal Zone.

Although General Goethals is a great engineer, it is recognized that his achievement at Panama was mainly due to his wonderful executive and administrative ability in creating and speeding up an organization which at its zenith numbered nearly 50,000 men. The *esprit de corps* which he inspired in the workers and their determination to put the job over was merely a reflection of the general's own personality.

Goethals's administration was known as a benevolent autocracy, with underlying justice for officials or laborers. His Sunday morning "court" was one of the institutions of the Isthmus, where he personally heard the disgruntled laborer or high official, settled personal and even family differences, administered discipline, heard suggestions for betterments and meted out justice to all.

And these Sunday mornings throughout his administration were at the expense of the rest and recreation of a man who was considered the hardest worker on the Canal.

Impatient of the inefficiency of divided control and responsibilities where a big job is to be accomplished, the general's opinion that "Boards are long, narrow and wooden" is an excellent indice to a big, kindly and brilliant soldier, engineer and administrator.

Major General Goethals received his training as an officer in the engineer corps of the United States Army. He was born in Brooklyn, N. Y., June 29, 1858. He was graduated from West Point in 1880, being commissioned a second lieutenant of engineers June 12, 1880. His first lieutenancy came in 1882, and he was promoted to captain, December 14, 1891. During the Spanish-American War he served as chief of engineers in the volunteer army, with the rank of lieutenant colonel.

He was promoted to his majority in the engineer corps, February 7, 1900; March 2, 1907, to lieutenant colonel, and December 3, 1909, to colonel.

By special act of Congress, Colonel Goethals, in recognition of his exceptional services on the Panama Canal, was advanced to the rank of major general, March 4, 1915.—*Aviation*, 15/10.

ARMY TRAINING FOR FRANCE.—The program of instruction of troops with a view of their fitness for service aboard emphasizes a course of concentrated progressive training for a period of 16 weeks and to this the troops of the various division at army cantonments will be subjected. The program as outlined by the War Department restricts this training (except for short periods of battalion training in the 15th and 16th weeks) to individual, squad, platoon and company training. Progressive training with the troops of the higher units, *i. e.*, regiments, brigades and divisions, will be taken up at the conclusion of the 16 weeks course. The time to be devoted to training each week is 40 hours, leaving Wednesday and Saturday afternoon free for recreation, and for additional drill for backward men. Target practice is continued to include the 16th week, great care to be exercised in the preparation of company schedules to cover the training of platoons and groups not firing, during the time allotted to target practice. Night work is of the utmost importance, and will include all phases of training, scouting, patrolling, marches, security, occupation of trenches, night relief of troops in trenches, trench raids, construction of trenches, obstacles, combat, etc. The specialties are given only the time which is considered absolutely necessary to secure proficiency. They will be vigorously taught. Ceremonies will be included in the time allotted for inspections. Refresher courses will be conducted every evening in each company for the officers and noncommissioned officers. These courses include a review of the day's

work, and a careful preparation for the work of the next day. Due to time which may be consumed in physical examination, vaccination, typhoid prophylaxis, possible quarantine, etc., it may be necessary to continue the training set forth for the first week over a period of two or even three weeks.—*Army and Navy Register*, 20/10.

TRAINING OFFICERS IN FRANCE.—Division commanders of the United States armies of all branches of the service, are being sent to France to learn at first hand the methods of modern warfare. Our soldiers are to be trained on American soil upon European lines. They will be made ready in this country, so far as practicable, for the kind of fighting they will be called upon to do when they have crossed the Atlantic.

The War Department has decided not to wait until the troops have reached France to begin the specialized instructions of the kind that General Pershing has recommended. So far as possible the methods of warfare that have been worked out by the French and British, and have been developed by actual and bitter experience, will be taught in the training camps this winter. From now on old-fashioned American ideas of fighting that do not fit in with the requirements of to-day, are to be scrapped as ruthlessly as are the officers of all branches of the service, who cannot learn, or adapt themselves to the principles of modern warfare.

General Pershing has recommended that division commanders be given an opportunity to visualize the war. In order that they might do this it was necessary that they be sent to France, and they are going over to get into actual touch with the whole military situation before the work of whipping into shape the national army, and the national guard that is still in this country, begins at the various cantonments, and of which they will be in charge.

Most of the major generals who so far have been given an opportunity to get into personal contact with the war have been accompanied by their staffs, so that a large number of the ranking officers of the army will have an opportunity to see for themselves how French and British soldiers have developed the art of warfare. It is no reflection on American officers that their military training has been along lines vastly different from those upon which modern campaigns are fought.

Our officers of the regular army have almost as much to learn as the men have. Trench warfare is only one of the things that is new to them. The question of supply also involves problems entirely different from any that have arisen in the kind of warfare to which the world had been accustomed until the Germans dug themselves into the earth in concrete trenches. Having no time to lose in the instruction of troops, as little time in the training camps as possible will be wasted on things that the men would have to unlearn as soon as they were confronted by the actual conditions on the western front.

By sending all the division commanders to General Pershing's headquarters for conference, study and intensive training, we shall have in a short time a group of efficient soldiers whose military education will have been completed by a post-graduate course in the school of war as it is fought to-day, and not as it was fought in 1898, in which year a large majority of those of our officers who have had any war experience at all, did the first and only fighting in their careers.

As these officers and their staffs return from the battle front, with new ideas that they will have gained through actual experience and by personal contact with British and French experts, and those American officers who are attached to the expeditionary army, there will be a speeding up in all the cantonments.

From now on the major generals commanding the various divisions will be thrown upon their own resources. It has been found to be vitally essential that they be given all the information possible upon which to act intelligently, for the new policy of the War Department is rapidly decentralizing

authority and giving to the army a greater freedom that it has ever known. Red tape in Washington is being cut right and left, and none too soon.

There was a disposition in the early stages of the war to concentrate all military authority in the War Department. An officer on the Rio Grande couldn't spend a dollar and a half without obtaining permission from Washington. When the divisional organizations were effected the same hampering policy retarded the work of the army officers who had been suddenly called upon to create at 16 different places frame cities for a population of 35,000. Washington insisted upon passing upon even the smallest details.

That policy has been scrapped. The war game has been growing too big to be handled in its entirety from the War Department. Under the new system that has come into effect every major general has been given all the authority he needs to run his own department in the most efficient manner. They are being given a free hand and are looked to now only for results. The transfer to them of the power to appoint and promote junior officers still further decentralizes the power of the War Department and places it at division headquarters.

In consequence there has recently been a quickening of activity all through the army. No more wholesome change would have taken place at this period of the war, when the great need is for the unhampered activity of the energetic and ambitious men to whom the country must look for the training of the vast army of citizens heretofore unaccustomed to arms.

The regular army has been expanded to such an extent by the addition of new recruits that it cannot spare the commissioned and noncommissioned men, who are really needed as instructors. In the national army an effort is being made to furnish each company with a first sergeant, a mess sergeant and a supply sergeant, all experienced regulars. Only a few drill sergeants from the regular army are available.

The task that confronts the division and brigade officers is thus a tremendous one, the magnitude of which is little appreciated by the public.

The policy of sending the division commanders to France has been adopted with a view to enabling them to get a right start and waste no time on unessentials. In the program of military instruction which they will carry out when they return they will be assisted by French officers and by American officers now with Pershing's forces, who will be called back in order that the full advantage of their experience may be obtained.

Officers who cannot deliver the goods must expect to step aside as ability is developed in others of more capacity. Under the system that it is proposed to put into effect the right man, as he comes up by merit, will be given the place for which he has proved himself to be fitted.—*Washington Post*, 23/10.

THE TRUTH ABOUT OUR ARMY RIFLES.—To-day, 6 months and 13 days after the declaration of war against Germany, the War Department is still evolving a rifle.

By decree of the Ordnance Board, the chief small arm of the United States forces shall be a remodeled Enfield, shooting Springfield ammunition. This weapon remains in the throes of development. And until it shall have been perfected the cartridges for it cannot be made.

Technical problems created by the Ordnance Board through its decision to rechamber the British Enfield rifle for American ammunition have practically tied up all the private cartridge-making factories since the declaration of war. Five great plants have been marking time all summer and fall, and by virtue of this the army's rifle ammunition supply is millions of rounds behind.

As to rifles, the facts that have already been established are briefly recalled. On the declaration of war by this country the Ordnance Board preempted the three private plants that were producing Enfield rifles for the British. It has kept them idle ever since while it perfected drawings and

specifications for an Enfield rifle rechambered to shoot American ammunition and so standardized in its parts that the output of all three factories should be interchangeable. These plants had a combined capacity of 9000 to 10,000 rifles a day. There is no other capacity in this country for "quantity production" of rifles. A few hundred Springfields a day are made at the government arsenals.

The cause of ammunition is parallel. American companies were producing British ammunition for the British Enfield rifle in enormous quantities. But as the purpose of the Ordnance Board in having the Enfield rebored was to make it shoot American ammunition, British cartridges were of no use. American, or Springfield, cartridges were needed. From the Frankford Arsenal the government could turn out only a limited supply—a comparative mite in the face of war-time demands. For the "quantity production" of cartridges, as of rifles, it had to rely on private plants. Having nearly all completed their foreign contracts, these plants turned in May to the task of making American cartridges for the Americanized Enfield rifle. Then arose this complication:

Progressive changes in the Enfield rifle in process of remodeling necessitated progressive changes in the Springfield cartridge, to shoot which the Enfield was changed.

The rifle is still an object of experimentation and development. Pending determination of its final form not a cartridge for it can be made.

Moreover, so the *Tribune* learns from authorities believed to be competent, it is not improbable that the Enfield rifle, strengthened at the breach though it may be, may never shoot with safety or economy the Springfield cartridge with its present powder charge. Ballistically the Springfield is much more powerful than the Enfield cartridge, having a breach pressure of 52,000 pounds to the square inch, as compared with a pressure of 46,000 pounds of the Enfield cartridge. To withstand even this pressure the Enfield has been remodeled in recent years, and some ordnance experts hold that it can be altered no more.

With this problem of ballistics the Ordnance Board is now wrestling, and until it is settled cartridge-making must wait. If the Enfield cannot be so rebuilt as to shoot the high-power Springfield cartridge it may be necessary to reduce the efficiency of the cartridge.

As to the wisdom, first, of rechambering the Enfield, when without such alteration the factories making that rifle could within a short time have attained a peak production of 10,000 a day; and, second, of insisting on interchangeability, ordnance specialists, engineers and toolmakers are widely at variance. Some hold that it was sound policy to retain the Springfield as the basic weapon of the United States Army, and that the rechambering and other alterations were logical steps which warranted and made tolerable the consequent delay.

Waiving all technical arguments, the point of the matter is that the three private rifle-making plants could have gone on making Enfields, and the cartridge makers could have gone on turning out ammunition to fit them, without affecting or retarding the plans of the Ordnance Board. If that course had been followed, the Ordnance Board, notwithstanding its work of remodeling the rifle, would be exactly where it is, and the country would be better off to the extent of 1,500,000 perfectly good British Enfield rifles and an enormous quantity of ammunition for them.—*Baltimore News*, 25/10.

THE GAS AND FLAME UNIT.—English military officers who are expert in the offensive and defensive use of gas and flame methods of warfare are constructing the officers and men of the 30th Engineers, Gas and Flame, at Camp American University and important secret tests are being made in practice work there. American soldiers, largely recruited from the ranks of such civil professions and trades as chemical and mechanical

engineering, explosive and gas manufacture, plumbing and carpentry, are being trained for this work.

Although the Gas and Flame unit was authorized as recently as October 15, rapid progress has been made in organization, due to its promise of early service at the front and on account of its special appeal to men experienced in civil trades which lend immediate qualifications for this special work. It is announced that there is opportunity for a limited number of enlistments for the following classes of men: Chemists, gas engineers, plumbers, electrical experts, pipe fitters, interpreters, mechanics, chauffeurs, explosive experts, cooks, gas experts, blacksmiths, carpenters, clerks and muscular, quick-thinking, resolute men, between the ages of 18 and 40 years, for pioneer soldier service of high character. Major Atkisson has announced that any man possessing the necessary qualifications may volunteer at any recruiting station of the country by asking to join the 30th Battalion, Gas and Flame, forming at Washington.—*Army and Navy Journal*, 10/11.

FIVE DRAFT CLASSES.—The Provost Marshal General has authorized the following classification of selectives into five groups, indicating the order in which they will be called to service:

CLASS I

1. Single men without dependent relatives.
2. Married man (or widower) with children, who habitually fails to support his family.
3. Married man dependent on wife for support.
4. Married man (or widower) with children, not usefully engaged; family supported by income independent of his labor.
5. Men not included in any other description in this or other classes.
6. Unskilled laborer.

CLASS II

1. Married man or father of motherless children, usefully engaged, but family has sufficient income apart from his daily labor to afford reasonable adequate support during his absence.
2. Married man, no children; wife can support herself decently and without hardship.
3. Skilled farm laborer engaged in necessary industrial enterprise.
4. Skilled industrial laborer engaged in necessary agricultural enterprise.

CLASS III

1. Man with foster children dependent on daily labor for support.
2. Man with aged, infirm, or invalid parents or grandparents dependent on daily labor for support.
3. Man with brothers or sisters incompetent to support themselves, dependent on daily labor for support.
4. County or municipal officer.
5. Firemen or policemen.
6. Necessary artificers or workmen in arsenals, armories and navy yards.
7. Necessary customhouse clerk.
8. Persons necessary in transmission of mails.
9. Necessary employés in service of United States.
10. Highly specialized administrative experts.
11. Technical or mechanical experts in industrial enterprise.
12. Highly specialized agricultural expert in agricultural bureau of state or nation.
13. Assistant or associate manager of industrial enterprise.
14. Assistant or associate manager of necessary agricultural enterprise.

CLASS IV

1. Married man with wife (and) or children (or widower with children) dependent on daily labor for support and no other reasonably adequate support available.
2. Mariners in sea service of merchants or citizens in United States.
3. Heads of necessary industrial enterprises.
4. Heads of necessary agricultural enterprises.

CLASS V

1. Officers of states or the United States.
2. Regularly or duly ordained ministers.
3. Students of divinity.
4. Persons in military or naval service.
5. Aliens.
6. Alien enemies.
7. Persons morally unfit.
8. Persons physically, permanently, or mentally unfit.
9. Licensed pilots.

—*Official Bulletin*, 26/10.

UNIVERSAL SERVICE.—In spite of the fact that Secretary of War Baker has expressed himself as being officially opposed to any change in the age limits of the Selective Service law, the plan to do this most effectively (which was first prepared and urged by Lieut. General S. B. M. Young, U. S. A.) is not only gaining influential friends among the leaders of thought throughout the country, but is also being used as an argument to blow into a blaze the dulling coals of the universal service propaganda. In our issue of October 20 we quoted Elihu Root's approval of General Young's plan, which is echoed in the favorable words of Cardinal Gibbons who said, in a letter addressed to the National Association for Universal Military Training: "The legislation will benefit youths from 19 to 21 years morally as well as physically and help to prepare them for their avocations or, if necessity arises, for the sterner needs of war." More significant than these expressions, from the purely Service point of view, is the statement appearing in the *Boston Transcript* that "through Colonel Robert L. Howze, U. S. A., chief of staff, to Brig. General John A. Johnston, commander of the Northeastern Department, a campaign of importance is to be undertaken at once in New England, to the end that the advantages to the country to be attained by the adoption of a system of universal military training may be brought intelligently before the people and ultimately be adopted as a fixed institution."

The need of universal military training in the United States has gained a powerful argument in its favor in the new draft regulations of October 22, a purpose doubtless not included in their formation. The creation of an army through the operation of the draft is still so novel an experience with us that we now stand only in admiring wonder over what is being done. But when this operation has to be repeated; when under the new selection principle we see the picked youths of the land going to the colors with absolutely no knowledge of or training for the task before them, then the practical side of universal military training is likely to appeal to the American people with a force never before felt. One of the psychological effects of our entry into the war is to make us think more clearly and act more directly than has been our wont.

With the exception of the society of which General Young is president, all the civilian organizations that were engaged in universal military training propaganda before our entry into the war appear to have abandoned that task, to take up soldiers' aid work for the most part. They may be reminded that there can be no better way of aiding the soldier than by urging a law whose operation will prepare him for a soldier's tasks before he is called to be a soldier. Thus it seems to be left to the army officer

to take up this burden; and Colonel Howze, at the beginning of his campaign in New England, points out that "the importance of the issue of universal training has been made subordinate to or altogether lost sight of in the questions raised by the draft."

It is not so long ago that the question of a shortage of labor was a thing unknown in this country. Man-power was a condition achieved and not a phrase coined by military economists to describe a slowly-passing phenomenon, wiped out by war. But now on all sides, from the smallest shop to the greatest industrial plant in the land, man-power is no longer an economic phrase. It is a question that touches our daily life at all points of contact; and even although we are only six months at war and have not lost a company in battle we are feeling this shortage of man-power every hour of the day. This economic disturbance was foreseen and explained by advocates of universal military training and service. Now we are reaping the reward of our indifference in the labor situation with all its costly burdens *en train*. Moreover we have a national army in training instead of being trained. The officers of the regular army have carried out the enormous burdens thrust upon them by the war so successfully that we foresee no less brilliant an achievement on their part in the matter of carrying the universal military service idea through to a state of achieved legislation now that they have taken that duty on themselves.—*Army and Navy Journal*, 27/10.

GOVERNMENT ADDS TO FACILITIES AT NEWPORT NEWS.—The largest single contract for government work at this port was let to-day to James Stewart and Company, Inc., of New York. The new contract is for over $10,000,000 worth of improvements at Pig's Point, facing Hampton Roads, and will include barracks for soldiers, concentration station, warehouses, piers, railroad yards and a railroad connecting with the Atlantic Coast Line.

The improvements will occupy over 323 acres of land. Work will start immediately.—*Washington Post*, 10/11.

MOBILIZATION OF FINAL QUOTA OF DRAFT POSTPONED.—Inability to secure winter equipment in sufficient quantities has forced the War Department to again postpone the mobilization of the final quota of drafted men.

Intended to have been completed almost a month ago, the mobilization is still far from finished and the cantonments from being filled.

Secretary Baker declared, however, that supplies were now being received in large quantities, and that the situation would not endure more than a week, when the remainder of the 687,000 men called in June will be mobilized.—*Washington Post*, 15/11.

THE WEST POINT SYSTEM.—Graduates of the U. S. Military Academy who hold opposite views as to the need of a revision of the courses of study at the Point will find much to interest them in the admirable article on "The Challenge of West Point," by Louis J. A. Mercier in the November number of *The North American Review*. Professor Mercier tells at the outset of his article that he shared with his colleague, Professor Louis Allard, of Harvard University, "the privilege of spending with the class of 1918 the last two months of its preparation (for graduation) in a capacity which gave us, I am told, unprecedented opportunities to study the life and the educational system of West Point," so that his judgments are pertinent in that they are based on very recent observations. Also they have added weight in that they are the comments of a man who has "seen service abroad," and also of one who "occupied a tent in the cadet camp and thus came in personal and informal contact with the cadets of all hours of the day."

Given the training of the writer, and the unusual opportunities afforded him to apply his training to the subject he discusses, it will be admitted that his views are worthy of consideration in all speculation on a subject

that was actively discussed in the service just prior to the entry of our country into the war. Professor Mercier points out, quoting Monroe's History of Education for his authority, that the question still foremost in American educational discussions is the conflict between the education of effort and the education of interest and states that it will be generally admitted that of late years "the education of interest" has continued to gain ground. It is because West Point is a challenge to the extreme form of this school of education as voiced by Jean Jacques Rousseau that Professor Mercier chose the words for his title. The great Frenchman put his idea of freedom in education into this extreme form: "Whatever may happen, abandon everything rather than have the child's tasks become irksome; for how much he learns is of no account, but only that he does nothing against his will."

Professor Mercier argues that the slogan of the new education is "self-expression," while the case of West Point is a clear cut challenge to this injunction of Rousseau's, since its slogan is "discipline." He says the new education asks: "What will you do and how do you prefer to do it?" West Point commands: "Do this, this way, and be quick about it!"

"According to the presuppositions of the new education," Professor Mercier continues, "the West Point cadet, faced at every turn with enforced work, should lead a forlorn and dejected life." Yet, on the contrary, what is to be observed? "Here West Point forces its challenge upon you. As a matter of fact, a happier, more exuberant mortal would be hard to find or one who speaks of his studies with more gusto."

After sketching the working day of a cadet with its obligations and possibility of countless penalties unknown to the average student, the writer imagines the exponent of the new education saying this is "artificial stimulation, the hope of reward and the fear of punishment taking the place of the motive force of interest." And he quotes in reply to this an imaginary West Pointer making answer: "No; but the multiplication of precise aims to be reached, the minute checking up of failures to reach given aims, a consequent training of the will which means formation of character, the power to bring to completion a distasteful task, to double effort when confronted with difficulties, and to accept manfully the consequences of mistakes and shortcomings."

Professor Mercier declares he saw the fruits of this system of education before him in the West Pointer whose "every movement is marked with celerity and precision, easy and unmistakably pleasurable, the result of multitudinous successful attainings of given ends." Yet, he points out, West Point realizes that an education wholly based on coercion has its dangerous limitations and takes care "to provide for the cadets many experiences outside of the class rooms and drill ground, social, cultural, religious." It will be noted that the writer nowhere touches on the subject of the need for a revision of the system of teaching purely technical subjects at West Point which, a few months ago, was the subject of so many interesting letters in the columns of the *Army and Navy Journal*. Doubtless he realizes and this is no time for such a revision, or reform, if some of our readers prefer that word and all it connotes. And this is a wise decision; although the matter is one that should not be forgotten by those in the service who are always thinking of its best interests and of the best interests of West Point. In a day when we are presented with a striking and shocking growth in our civil life of the kind of tendencies advocated by Rousseau, as indicated by the increase of Socialists with their pro-German tendencies, it is pleasure to be presented with this sketch, by a man whose opinion is worth while, that West Point sets its face against a false "self-expression" and insists upon "discipline." Our country never needed that moral imposition so much as now.—*Army and Navy Journal*, 10/11.

GENERAL

THE NAVY AND THE ECONOMIC WEAPON.—Again Lord Robert Cecil, it is presumed on behalf of the British Government, has announced that the economic weapon is one of the most deadly which can be turned by the Allies against Germany. But he said as much months ago, and nothing particular happened. This time, however, words have been followed up by action. Not only is Holland being asked to explain suspicious conditions in her trade, but she has been cut off from the use of British cables. These are excellent, if belated, signs that our Foreign Office is waking up. But much more is required to make the neutral powers feel the edge of the economic weapon, much more to feel its point, and what one fears is that it is not being used in the right way. For if we really meant business in this connection should there not be a corresponding alteration in our methods? But is there? The trouble with them has always been that they were diplomatic and not, as they should have been, naval. Two reasons have been given for this: one, that the United States might have taken sides against us if the fleet were allowed to perform one of its most important functions. As things worked out, she joined the allies, not because of the favors she received from the allies, but because of the crimes committed against her by Germany.

The second reason why we are such an inconceivable time in supplementing our naval and military strength by employing the economic weapon is that we have so tied ourselves up by agreements and licenses as to paralyze organization. But in ordinary business there are two parties to a bargain, and if one fails to perform his share the arrangement is void. According to the Foreign Office memorandum published in the United States recently our agreements with individuals and corporations in neutral countries are scraps of paper and little more. Therefore, this country is not bound by them. Then why is not diplomacy, which, in time of war, is impotent to use the economic weapon apart from the navy, not superseded by action at sea? But we are told that a proclamation has been issued practically forbidding all traffic with Scandinavian countries; as if the course of the blockade has not been strewn with proclamations, most of them more or less useless for military purposes. More over the latest of the kind is couched in such bad English as to be unintelligible even with a board of trade interpretation of it, and is silent as to whether it suffers our entangling agreements and licenses or cancels them. No wonder there is doubt as to whether it marks a definite change of policy or not.

If business were meant would not the stream of proclamations be dried up and instructions given to the fleet not to allow an ounce of food or material to reach Germany? Up to now our sailors have had to stand idly by and see millions of tons of supplies pass over the sea for the use of the enemy under their very eyes. Even more galling has it been for them when, time after time, they have taken a ship into port only to find that the Prize Court was bound to release it under Foreign Office instructions. Put the economic weapon into the hands of the sailors, who know how to use it effectively, and take it out of the hands of the diplomatist, who does not, and in the nature of things, cannot. The second has had a free hand for three years, and, on his own confession failed. Give the first the same opportunities, and in three months neutrals will be just as friendly—which is not saying much—while the Central Empires will no longer play with starvation for political purposes, it will be on them in terrible actuality. The United States does not waste its time on proclamations. It uses its power in decisive action. There are dozens of Dutch and Scandinavian vessels held up in American ports because their owners refuse to guarantee that the cargoes will not reach the enemy. Presently the American Government will take these over rather than let them rot. As for giving way, there is no thought of it the more the nakedness of the traffic is exposed. Why cannot we take similar measures and give proclamations

a rest, in which the word "may" occurs oftener than the word "must"?—*The Army and Navy Gazette*, 20/10.

BOMBS DROPPED ON THE BURBACH WORKS.—An official statement on aerial operations issued October 26, reads:

"October 25 factories and railway communications in the vicinity of Saarbrucken were attacked by our airplane squadrons with excellent results. More than three and one-half tons of explosives were dropped on the Burbach works, just west of Saarbrucken, by naval machines. The damage caused was considerable and many fires were observed.

"Three thousand three hundred and thirty-five pounds of explosives were dropped on railway stations, junctions, goods sidings in and around Saarbrucken by another squadron. Many direct hits were obtained, resulting in numerous explosions.

"One train proceeding to Saarbrucken received a direct hit from a big bomb and was destroyed. A total of five tons of explosives was dropped by us.

"The enemy's anti-aircraft defences were strong. At first the weather conditions were good, but later became very bad, with rain, low clouds and a strong wind, making the return of our machines most difficult.

"On October 24 there was a slight improvement in the weather on the British front, though drifting clouds and a very strong west wind made observation and fighting over the enemy's lines difficult. One hundred and fifty-four bombs were dropped during the day on the enemy's billets, 12 heavy bombs on an airdrome near Courtrai and 71 others on German troops in trenches and in the open.

"At times the fighting was severe. Four hostile machines were downed by our airplanes; one was shot down by our infantry, and three other machines were brought down out of control. Six of our machines are missing."—*Washington Post*, 27/10.

GREAT ACHIEVEMENTS OF BRITISH NAVY.—Since the beginning of the war the navy has ensured the safe transportation to the British and allied armies of 13,000,000 men, 2,000,000 horses, 25,000,000 tons of explosives and supplies and 51,000,000 tons of coal and oil. The losses of men out of the whole 30,000,000 were only 3500, of which only 2700 were lost through the action of the enemy. Altogether 130,000,000 tons have been transported by British ships.

GERMANS BOASTFUL ABOUT RAIDS.—When the German fleet took the Gulf of Riga, and at the same time two German cruisers destroyed a convoy at the Shetland Islands, while Dunkirk was attacked by German torpedo-boats, there was hardly one German paper that did not ask, "Where was the British Navy?" This question, Berlin has heard since, was echoed by the English, and, in fact, by the press of the whole world with more or less astonishment or indignation, as the case might be.

In to-day's *Tageblatt*, Captain Persius, after describing the great chances to assert itself which the English Navy missed, seeks to explain the reasons which may have actuated the First Lord of the Admiralty in remaining so strangely passive. He writes:

"No commander of any fleet who does not at least try to get his opponent can expect to retain confidence. Such a commander cannot expect any success by his passive attitude when opposed to a sea power like Germany. In seeking for the reasons of the British inactivity, one should not blame the British naval officers and crews for a lack of courage, efficiency and spirit of sacrifice, because there is sufficient evidence to prove the contrary.

"If the British Navy has failed it is in all probability the fault of the Admiralty. The reasons for this reservation and preservation of men and material are not easily discoverable from this side. Perhaps a fear of the

great responsibility caused the Admiralty to hesitate to risk an operation the success of which was doubtful. The First Lord of the Admiralty wants a majority of the chances of success on his side, and in the present case he may have considered that the forces at his disposal, for the operation in question, were not equal to the German naval forces and the German coast defences.

"It is also possible, as has often been hinted, that diplomatic pressure restrains the activity of the navy. However that be, there is no doubt that all recent First Lords of the Admiralty have reserved an attitude which does not honor the tradition of Great Britain's navy.

"Will the British Navy exchange its attitude of reserve? Of course, after the events of Riga, the Shetland Islands and Dunkirk the English press will clamor again for an energetic offensive, but we doubt that anything will come of it, though some papers hint at a general offensive in which the English, as well as the American, French and Japanese fleets will participate.

"Well, perhaps the English Admiralty considers an offensive against the German shores, even with the help of the American and other fleets, yet there is a possibility that the British Navy, after the mortifying events in the Gulf of Riga, and under the pressure of our U-boat war, may proceed to a general offensive.

"We are mainly interested in the question whether such a general offensive might be carried out with decisive success. I decline to prophesy, but to judge from the conduct of the British offensive at the Dardanelles, one would say that an attack on the much stronger fortifications of Heligoland Bay would seem to have few chances of success.

"Besides, before any coast defences can be attacked, the German Navy must be destroyed. We may, therefore, well conclude that a general offensive by the navies of England, America and France will only be undertaken as a last resort."—*N. Y. Times*, 27/10.

ESCAPE OF GERMAN PRISONERS.—Lieutenant Hans Berg, who brought the British liner *Appam* to Hampton Roads as a prize after her capture off the Azores by the German raider *Moewe* nearly two years ago, was one of 10 prisoners who escaped last week from the detention camp at Fort McPherson, Ga. The other nine were members of the crews of the *Appam* and the commerce destroyer *Prinz Eitel Friedrich*.—*Shipping*, 3/11.

SUBMARINES FEAR DESTROYERS MOST.—Diaries taken from captured U-boat commanders furnish documentary evidence that the destroyer is the most effective of present weapons against the submarines. "Avoided destroyer" is the oft-repeated entry. In fact, these logs show conclusively that the submarines are having a hard time of it.

The result of the destroyer activity during the last four weeks has been not only a decrease in casualties of merchant ships but a still more satisfactory increase in the number of submarines sunk.

The convoying of merchantmen has now reached a state of considerable perfection after many months' work in training both the officers of merchant ships and the personnel of the patrol flotillas. While systematic convoying was undertaken primarily as a defensive measure, it has now developed that convoying is at the same time the best offensive measure yet devised against the U-boat.

The offensive side of convoying may best be shown by an illustration. When a submarine tries to torpedo a convoyed ship—as submarines are now compelled to do owing to the infrequency of unconvoyed shipping—there is always a destroyer on the scene, and the chances of her "getting" that particular submarine are correspondingly increased. The wake of a torpedo is generally seen by the destroyer's lookouts, and it gives a good line on the direction where the submarine is lying.

The destroyer immediately steers a course full speed in the line shown by the torpedo's wake, and drops repeated depth charges along this course. In a considerable proportion of cases this proves effective, for these depth charges cause serious commotion over a considerable radius.

The Associated Press correspondent was told of three cases in the last fortnight in which submarines were thus destroyed. In many instances, no doubt, submarines are destroyed without any visible indication above water of their loss. Still others are badly crippled, as in the case of the damaged German U-boat which was recently interned in Spain.

Another submarine which will never return to Germany was sunk under peculiar circumstances a short time ago. This U-boat torpedoed a ship bound from the United States, firing its torpedo at a range of only about 100 yards. It is extremely unwise and unsafe to fire a torpedo at such close range, but the U-boats must take their targets as they get them these days.

The torpedoed ship was loaded with a cargo of heavy war materials, and the explosion was so forcible that it blew a large piece of heavy material through the deck of the ship and dropped it on the submarine as the latter was submerging. The hull of the submarine was crushed like an eggshell, and she sank with all on board.—*N. Y. Times*, 4/11.

COMPARATIVE COST OF ARMIES.—Germany is putting 14.3 soldiers into the field for the same amount of money which the United States is paying for a single fighting man, according to calculations of government experts. They said the same general proportion was true also of maintaining the armies in the field, or, in other words, America must raise $14.30 where the enemy nations raise only $1 to carry on the war.

The difference was said to be due to the higher pay of United States soldiers and the greater cost of supplies in this country, and the contrast was used as a text for admonitions that resources alone would not win the war, but that strict economy was necessary.—*N. Y. Times*, 4/11.

NEGOTIATIONS WITH GERMANY FOR WELFARE OF PRISONERS.—The United States has opened negotiations with Germany for an agreement to govern the treatment of prisoners of war taken by either nation. This is being done with the hope of securing the best possible conditions for Americans taken prisoner on the battle front, and to show Germany how well German prisoners in the United States are being treated.

Already, through the Red Cross at Geneva, the United States has begun forwarding food and other necessaries to Americans held in Germany, of whom there are now more than 100. It is realized that, as the American troops increase in numbers on the battle fronts, more prisoners are bound to find their way to the German prison camps.

A nation pinched for food for itself probably will feed its enemy prisoners last. To lighten the confinement of Americans who will have to undergo the hardships of prison camps will, at the same time, alleviate the suffering of families at home, which naturally will be distressed at accounts of German brutality and underfeeding of their enemy prisoners.

German military prisoners of war in the United States, besides receiving every necessity and comfort, have the pay and privileges of their rank in the United States Army and Navy. They are housed in model sanitary camps. Recently one of the prisoners, sending a letter to his prospective wife in Germany, wrote that the pay he would accumulate during his imprisonment would not only permit him to retire from the navy, but would set them up in a little business as well.

Photographs showing the comfortable surroundings of interned German prisoners in this country have been forwarded to Germany by the War Department through the State Department and a neutral agent. They are intended to show that interned Germans are well treated by the United States, and to reveal the expectation of the United States that similar consideration will be shown American soldiers and sailors who may be captured by Germany.

Two classes of German prisoners are detained in this country. One is comprised of German sailors taken into custody when the United States interned various vessels at the beginning of the war. The other class is comprised of enemy aliens, civilians, who have been arrested and are now being detained under governmental regulations for various reasons.

The principal detention camp is at Fort McPherson, Georgia, where approximately 850 war prisoners are held in custody of the War Department. At Fort Oglethorpe, Georgia, there are 165 enemy aliens, who are not, strictly speaking, prisoners of war. At Fort Douglas, Utah, there are 517 prisoners of war and 80 interned aliens.

Small detachments of other interned aliens are now temporarily quartered at army posts throughout the country, but their number is relatively small. In addition the Department of Labor has in custody several hundred Germans, members of the crews of merchant ships. This group is divided between the immigration station at Ellis Island and a detention camp at Hot Springs, N. C.

Altogether there are 1364 actual prisoners of war in custody of the War Department, and about 400 interned enemy aliens held at the request of the Department of Justice. Of this number about three score are located on Taboga Island, Panama. It is estimated that Germany is now holding 150 sailors taken from American ships by commerce raiders and other German vessels, besides the first prisoners taken from General Pershing's forces.

A representative of the Swiss legation, the war-time diplomatic representative of Germany in this country, recently inspected the detention camps at Forts McPherson and Oglethorpe. Conditions at both camps were reported as satisfactory by the Swiss representative.

The detained Germans, wherever located in the United States, are considerately treated and are not given onerous tasks. The duties assigned are strictly in accord with international law. Their work has been confined to construction of barracks, the cleaning up of grounds about the camps and light road work about their barracks. Some of the German prisoners at Fort McPherson are engaged in making toys in their ample spare time.

Reading and recreation facilities are provided. Photographs collected from the several detention camps show German prisoners going through outdoor gymnastic exercises and staging amateur plays on improvised stages and in the recreation rooms. The quarters for German prisoners are much like those provided in the cantonments for the American soldiers.

The set of photographs transmitted to the German Government shows both exterior and interior views of the detention camps. The sleeping quarters are roomy and clean and the sanitary arrangements, from kitchens to bathrooms, are modern and not unlike those provided by the United States at the National Army cantonments.—*The Sunday Star*, 11/11.

PERIL IN ALLIED STAFF.—Repington, writing on the supreme interallied war council, says:

The creation of a supreme political council of the Allies for the whole western front and the attachment of an advisory military committee are innovations fraught with so many possibilities for good and evil that they deserve to be carefully considered.

The chiefs of our war and general staffs or representatives nominated in close agreement are obviously the proper persons to accompany the ministers when naval or military affairs are under discussion. The province of these chiefs is war organization, strategy and operations. It is right for the government to select those considered the best men and change them if they prove inefficient, subject to this proviso—that they possess the confidence of the fighting services. But, having chosen them, they should follow their advice on all affairs within the province of the technical advisers. To collect a second set of advisers in any form is to risk the receipt of two different sets of advice, in which case the ministers, neces-

sarily incompetent in such technical matters, become arbitrators in them and practically direct strategy.

Commanders on sea and land are dependent on their governments for the means whereby campaigns are won or lost. Our military effort in this war has been great, but the writer can only repeat his oft-expressed opinion that the bases of our military power have never been broad enough to support the ambitious scaffolding of world-wide operations erected before the general staff came into its own again in the autumn of 1915. We need only to consider how many divisions we have in the field as compared with 238 by Germany to have a complete answer to the question why we have not yet won the war. For the suggestion that our disappointments in Russia and Italy are due to faults of ours or would not have occurred had the supreme political council and advisory military committee been in existence is a grotesque travesty on the truth, and already has been exposed in leading articles in this journal.

The writer has no doubt that the ministers present at the international war conferences should be accomplished by the chiefs of the war and general staffs of their representatives. It is a slight upon them that it should be otherwise, and it can be shown that it is also a grave and, indeed, a fatal disadvantage. It is the duty of the advisers to advise, and the advisory military committee is not likely to be backward in this respect.

But they have no executive powers, and, therefore, this wholly false position will arise that power will be divorced from responsibility. One set of people may offer advice and blame the executants if things go wrong, while another set of people will execute and blame the advisers if the same thing happens. Who, then, will be responsible for anything? Nobody can say.

There are also the commanders in the field to be considered. They will view with disapproval any attempts to interfere with their plans and arrangements by any body which they will regard irresponsible. These commanders, whether British or others, have hitherto worked intimately with their general staffs in a close community of ideas. Could their opinion of the Paris committee be made known it would, in the writers opinion, not be favorable, but wholly the reverse.

We cannot afford at this moment of serious crisis to risk a schism between politicians and soldiers or sailors. That there is trouble ahead unless the status of the advisory military committee is better defined, can hardly be disputed. This should not be difficult. We are all for unity of control and the supreme political council will help to secure it. The real need is to supplement the new council, not by a fresh set of military advisers, but by a secretarial one on the lines like the old defence committee of the present war cabinet.

There is obvious need of keeping records of proceedings and decisions, preparing agenda and collecting materials to assist the deliberations of the members. In any case it is a political decision by Lloyd George's cabinet which creates the supreme political council and the invariable rule is for the fighting services to accept such decisions and endeavors to make the best of them by loyal service.—*Washington Post*, 15/11.

FRENCH ARMY USING 22-INCH GUNS.—First official confirmation of the fact that the French artillery is equipped with the largest caliber guns in the world has come through the release in Paris motion theater of the government film entitled, "The Military Power of France in the War."

The action shown in the film wherein, for the first time also, is officially revealed the fact that French storming troops carry steel shields is more stirring than that in any other "war picture" presented.

One of the most stirring scenes is General Petain's review of the troops of General Guillaumat's army which recently drove back the Crown Prince's forces to practically the identical line from which they started in

the terrible Verdun drive, which began February 21, 1916. Thousands of short, sturdy *poilus* filed past the camera.

"Big Bertha" Outdone.—Heretofore the "quatre cent" howitzer—as the 400 millimeter gun is called, has been regarded as the most powerful weapon in use by the Allies. It is still larger in caliber than the 42 centimeter—or 420 millimeter—Skoda howitzer which the Germans sprung on an astonished world at Liege in August, 1914. The fact that France had devised, constructed and perfected a weapon four inches larger in caliber than the greatest German piece has been kept a profound secret, even the soldiers at the front being unaware of the exact bore of the monstrous cannon.

I have seen French official photographs of the German "Big Bertha," of 42 centimeters, and, comparing the Skoda product with the French "520" one finds the Allies' gun a much more efficient weapon, due primarily to its greater range. The 42 centimeter piece is in reality more of a mortar than a howitzer, having a short, squat barrel and always being fired at a very high elevation.

Naturally, it was necessary that the length of the barrel of the French gun should be longer owing to the greatly increased caliber of the piece, but as a matter of fact, the French rifle is lengthened to such a degree that the huge piece is, in fact, a howitzer and capable of hurling its three-ton shell at high velocity and, therefore on a relatively flat trajectory.

Used in Verdun Surprise.—The "520" was used in the great Verdun surprise attack of August-September last and again in General Maistre's operations along the western end of the Chemin-des-Dames, in the neighborhood of Laon. Its great projectiles, raining down on the quarries where the enemy reserves were ensconced, wrecked the entrances to these underground positions and prevented the men inside from debouching to aid the first-line troops actually engaged. Two shells from a "520" made debris of Fort de Malmaison, which the Germans had reconstructed into a supposedly impregnable position.

Obviously the mammoth 22-inch gun is too massive for ordinary use. Roads, bridges, railways and other transportation lines have to be specially constructed to bear even the weight of carrying up projectiles for the weapon. The sphere of the "520" is limited to such operations as smashing in quartrie or other great natural strong points which the Germans have consolidated into fortified positions.—*Washington Post*, 15/11.

LACK OF ORDNANCE MACHINERY.—At the moment when it needs all the ordnance possible to obtain from any and all sources, the government finds itself embarrassed by a situation due in part to the strikes at government arsenals and in part to shortage of tools, machinery and material.

The supply of rifles for soldiers is wholly inadequate, with only about 5000 available for each cantonment or camp of approximately 40,000 men. But according to officials their worries are directed at this time more to field pieces and heavier artillery, with the matter of supplying service revolvers having a place of secondary importance.

The continuing labor troubles at Watervliet and Watertown arsenals threaten to diminish the already inadequate supply, latest advices to the War Department showing no change in the sentiment of the men at the places as a result of the assurance from the Buffalo convention that no strikes would be allowed to interfere with vital government work.

To this labor handicap has now been added another and even more serious deterrent in the lack of important tools and machinery. The two and a half years of war which had ensued before the entrance of the United States resulted in England and France sweeping the rest of the world for heavy-duty lathes, drills, slotters and planes used in the making of large guns and of armor plate.

There are comparatively few firms manufacturing these types of machinery, and the stockrooms of these have been bare for more than a year.

Moreover, the entire output of these factories has been booked up in many cases until late in 1918. The sub-committee of the Council of National Defence handling priority of contracts has relieved the situation to a slight degree by arranging for the transference of a part of these orders to the United States Government.

Private manufacturers who have contracts with the government for millions of dollars' worth of ordnance are faced by the necessity of cancelling such orders because of their inability to equip their plants and to replace wornout tools. Recently an American firm sought from the War Trade Board permission to export a "heavy duty lathe" measuring 30 inches by 30 inches by 10 feet.

The expert on the board who has jurisdiction over machinery applications told the applicant frankly that no such permit could be granted for the remainder of this year. Moreover, the expert said, if the government could obtain information as to the source from which the firm hoped to procure this machinery it undoubtedly would be commandeered forthwith. The firm making the application thereupon notified the board that it would be glad to turn the machine over to the government.

"The output of the government arsenals at Watervliet and Watertown is being seriously curtailed because of our failure to secure lathes, slotters and large drill presses," said this official. "If the equipment were in sight, we would proceed immediately to triple the size of certain departments in these arsenals. The skilled labor, hitherto a problem, has been secured, but we cannot find the machinery for this labor to use. If one of the nations allied with us should ask for permission to export a single machine of certain type we would weigh the application most carefully before deciding."

In connection with the question of supplying government arsenals and other plants with skilled labor, it is learned that the government now has in active and successful operation employment bureaus scattered throughout the country. These bureaus keep in touch with the classes of workmen who are urgently needed, and advise them of the openings available.—*N. Y. Times,* 18/11.

THE KAISER LAUDS U-BOATS.—The German Emperor, according to a Berlin dispatch, in addressing the U-boat crews in the Adriatic and referring to the development of the submarines, said that a voyage of three or four weeks now was an everyday occurrence and declared that the development of the U-boats had not reached its highest point.

He expressed gratification at the amount of the tonnage sunk in the Mediterranean, which he said, showed that the U-boats had fulfilled what had been expected of them. Submarine warfare would have a decisive part in the final outcome of the war, the Emperor declared, and would not be stopped until the enemy was vanquished.

The Emperor concluded: "I am certain that our submarines will never rest until the enemy is subdued. But for this we need, as well as power of man, the aid of God."—*Washington Post,* 16/11.

SUBMARINE SITUATION COMMENTS BY ARTHUR POLLEN.—Some four or five weeks ago I ventured, in the columns of *The New York Times,* the statement that the back of the submarine menace seemed to have been broken. Things have taken so satisfactory a turn since then that yesterday it seemed justifiable to say that the ruthless campaign had definitely failed in its two main objects, namely, to starve Great Britain and exclude the United States from taking an active part in the war on land—in other words, that the German threat had been signally defeated. This has been challenged in many quarters—especially interesting is Sir Eric Geddes's caveat—as too optimistic a statement, and I am asked exactly what I mean by it.

Well, I mean exactly what I have said and no more than I have said. Great Britain will not be starved nor the allies; nor can America now be

kept out of the war. But I have not said, and I do not mean, that all the German submarines have been sunk or that they will fail in sinking any more ships; nor that the anti-submarine campaign will not be continued; nor that the building of merchant ships will not be speeded up; nor, finally, that the campaign may not be revived either with new material or in a new field. Of course the countermeasures must be kept up as vigorously, nay, more vigorously, than ever. Of course the enemy will try new types and new fields. The point is this: Do we know enough about the character of the submarine war and of the resources of the enemy to say with confidence that these new developments are no more likely to achieve the German object than those which have already been countered with success? To answer, it is necessary to rehearse one or two of the main elements of the problem.

The submarine cannot be literally and totally defeated until it is made impossible for a single one of these boats to get out of German waters into those where naval and carrying ships are passing. It is inconceivable that any form of barrier could be established, whether by nets, or mines, or observation posts employing any or all of the methods of detecting the presence of invisible craft and, on detection, dispatching craft suitably armed to attack the underwater boat while it is below the surface—no system of barriers of this or any other kind can be completely effective. Consequently there is but one final answer to the submarine, and that is to take the enemy's ports, and so deny him access to the sea altogether. So long as these operations are impossible the total suppression of the submarine is impossible. And failing this, the submarine must be dealt with by one and all of the following methods:

First, its passing from German to Allied waters must be made as dangerous as possible. Next, those that escape this peril must have their task made as dangerous as possible by the concentration of shipping to routes that can be patrolled, by the convoying of ships generally, and through these routes and by the arming of individual ships that cannot be convoyed; thirdly, general and systematic hunt for, and pursuit of, submarines in all areas otherwise favorable to their operations, must be maintained. Finally, their operations must be made difficult or ineffective by camouflage, by equipping ships with the means of evasion and concealment, and by loading ships and fitting them so that when hit by torpedo or shells, as many as possible shall still remain afloat. How have these measures worked in the last nine months:

No detailed history of the progress of the anti-submarine campaign is available to us. But the indications are that its improved efficiency has been brought about partly by camouflage, partly by more vigorous patrolling, partly by the arming of ships, but mostly by the development of convoy. If these inferences are correct, it is more along the line of defensive than of offensive action that the general defeat of the submarine has been brought about.

And this is extremely significant. For it is a commonplace that the defensive is the weakest form of war. It means a dissipation of force. It means that the enemy is left with the initiative and enjoys the greater freedom of action. All we have done is to make some localities more dangerous for him than others. We have done our best to concentrate our own traffic to those localities, we have made the traffic itself combative, or escorted it with combatant ships. The direct attack on the submarine has been incidental to our defensive; it has been more or less limited to the same agencies that made the concentration localities dangerous. In other words, we have only taken the offensive when the enemy gave us the opportunity.

Now, if this form of anti-submarine war has so far succeeded, as it plainly has, that our losses are for the moment negligible, we must next ask ourselves: Can the enemy by any new grouping of his units, or by the employment of units of a new kind, bring our generally defensive measure to naught? And, next, can we pass from the defensive to the offensive in a

more direct and conclusive manner and not only complete the work we have already begun against his units of existing type, but make that offensive equally effective against any new type he may produce? The whole thing turns upon what is open to the enemy in new forms of submarines and in the seeking of new fields, and what is open to us in new forms of barriers. Let us deal with the enemy's policy first.

For nearly two years now we have been hearing of the new big U-boat able to carry 6-inch guns in plated hoods, so as to be immune from danger of any form of fire of guns not exceeding 4 inches in caliber. Such a boat could survive direct hits made by shells with flat trajectory such as are normally employed for arming ships. There is no mystery about armor-plated submarines. They have long since been recognized to be practicable, and there is no theoretical limit to their size. A 10,000-ton submarine, armed with 12-inch guns, could be built and should undoubtedly be seaworthy. But a 6-inch gun armored submarine would not be practicable unless she displaced 3500 or 4000 tons. With her conning-tower submerged, she would certainly draw between 40 and 50 feet of water. With her upper works armored, her under body could not be protected at all. She would be just as vulnerable to mines, depth charges and howitzer shells—which would burst under water as depth charges do—as any existing type of submarine. Her greater draft and larger bulk would make it more dangerous for her to pass near a mine field, would make her an object more easily detected by the means by which things invisible but moving under water can be found, would make her a mark very much more easy to hit by howitzer fire, depth charges and torpedoes.

In other words, everything gained in protection against direct gunfire must be lost—and perhaps, as we shall see, more than lost—by the greater expanse of vulnerable underwater body, if any other attack than gun attack is developed. And it must be added here also that every fathom added to the draft and girth automatically limits the area within which the submarine can safely operate submerged. The type, then, is very far from being invincible.

Are boats of this type to be expected on the sea routes in the near future? That they have so long been threatened seems to point to the fact that there has been real difficulty—or at least real hesitation—in producing them in quantities. Germany's building facilities are far from unlimited. Her capacity almost certainly does not exceed three submarines a week of the old type. An experimental boat of a larger size may very likely have been started two years ago or more, but when one remembers the infinite (and touching) faith in the success of the old type boats when ruthlessly employed, is it not highly probable that all efforts would have been concentrated upon producing these, at least up to the time when their failure had reluctantly to be admitted? It seems, then, unlikely that Germany can have any large numbers of the 6-inch gun submarines ready for sea.

If they exist, what is their value? Clearly, if they have good surface speed, so that escape by flight would be impossible to the majority of carrying ships, then each will be almost as formidable as armed raiders like the *Moewe* until they meet superior force in the form of ships armed with howitzers that can attack their underwater parts, as well as guns that hit the exposed turrets and conning-tower. They could not, of course, carry armor sufficient to protect them against 6-inch guns, and convoys under the protection of warships so armed would be as safe from the new type of U-boat as from the old.

To deal with such a type, then, is not a problem essentially different from dealing with the smaller type. It certainly calls for a new armament. The necessity of being ready for such a development as this has been foreseen for at least as long as the rumors of its imminence have been in circulation. Should such boats really appear then, they might have for-

midable local successes, and possibly a temporary general success. But it should not be long before they should be neutralized.

How about the capacity of such boats to go farther afield? A greater radius of action would follow automatically from their greater bulk, and greater radius might be supposed to imply an extension of the danger zone. But the old boats could operate as far afield as they liked. Witness events in the Mediterranean for the last two and a half years, and the adventures of the *U-53* off Nantucket 13 months ago.

It would seem, then, that the enemy had always had it in his power to extend the danger zone by 3000 miles whenever he liked. If he has not done so, it must be for very good reasons. The reasons, of course, are that it is no use going anywhere except where he is likely to find ships. *Prima facie*, then, larger and more powerful U-boats will give him no new facilities for attacking in new fields. But this is not to say that the new facilities will not make the invasion of new fields worth while when before it was not worth while. The point is that mere extension of field is not a new development necessarily favorable to the enemy. And, if tackling the larger boat is a mere extension of the old formula of tackling the smaller, it is difficult to see how either the threat of a new type or the possibility of an enlarged zone can change conditions so materially as to put us back where we were six months ago.

And meantime our major coup is still to be played. If the submarines cannot be suffocated in their bases, they can, must, and undoubtedly will be blocked by mine fields and other forms of barriers before they have left their bases very far behind them. For a year the most active scientific and naval brains in England, and for nine months the same admirable agencies in the United States, have been working independently and co-operatively to solve the problem of making a wide waterway impassable by underwater craft. It is, of course, much more than two years since writers in England urged that vast mine fields should be laid across the North Sea, the upper layer deep enough at low tide to enable surface ships to pass over them, the lower layer near enough to the bottom to make passage beneath them impossible, and, where necessary, intermediate layers to catch a submarine at any level of submergence. To make the North Sea impassable, a number of mines would be required which is, no doubt, fabulous. At its narrowest the North Sea is 250 miles across, and when allowance is made for fields at different levels nearly 100 mines to the mile would be required for the original barrier. And it would have to be renewed from time to time.

Mines, of course, are not the only possible form of barrier. And, whether the obstacle were passive or active, it would involve an immense amount of preliminary work and immense resources constantly devoted to its maintenance. It is not to be expected that the development of some such attack as this on the submarine has not been in active progress during the last year, or at least during the last six months. As we have seen already, it is inconceivable that it can ever be theoretically completely effective. But it is originally inconceivable that an obstacle that is extremely effective will not, in due course of time, be made.

Are not two reflections on this state of things both obvious and encouraging? There is every reason to suppose that the breakdown of Germany's submarine activities has been brought about less by there being an insufficiency of boats with which to carry them on—indeed the First Lord of the Admiralty says the Germans are building faster than we can destroy—than by the insufficiency of the warlike spirit necessary for manning the available boats. In the weakest kind of war, then, we have brought the enemy's morale down to a point at which his offensive has failed. We are, or must soon be, passing to the offensive ourselves, and he can only vary his units of attacks by going in for a type of boat which will be singularly vulnerable to the measures we are about to adopt.

For the better gunned, the better armored, the faster and more mobile the submarine, the greater the danger to it both from a mine and from any other form of barrier. For you can add nothing in the way of fighting power or protection or speed or fuel endurance to the U-boat without paying for this improvement in size, and with every increase it must lose something of its power of evasion, a faculty the importance of which will increase in proportion as our barriers rise in efficiency. If, then, the main campaign has failed in its two objectives, the starving of England and the exclusion of the American Army from France, when we were limited to the defensive, because in spite of these limits so many submarines were ultimately destroyed, is it likely that a new campaign can proceed when we are passing to the offensive? And any German hopes based on larger vessels seem likely to be discounted by the fact that it is precisely size that will be the chief difficulty in overcoming our attack.

We have, of course, to keep things going as hard as ever. Until the barrier is complete, if ever it can be made so, it would be to the last degree unwise to slacken any one of our precautions. And as for replacing losses, while we can keep pace with the present rate of destruction with comparative ease, we must not forget that nearly one thousand British ships have been lost in the last 12 months, so that there is a tremendous leeway to make up before even our old ship capacity is restored. At least half as many neutral ships have been lost, too, and, finally, we can never have too many ships. The moral of the situation, then, is neither overconfidence nor any relaxation, but a greater effort than ever, spurred now not by the desperate necessity of avoiding defeat but by the exhilarating assurance that every blow struck is now a blow for victory.—*N. Y. Times*, 18/11.

INDEX OF WAR VESSEL LOSSES MENTIONED IN THIS NUMBER

NOTE.—A complete table of losses since the beginning of the war will be published semi-annually; the latest appears in the July number of the PROCEEDINGS.

UNITED STATES VESSELS

	PAGE
Transport *Antilles*	3025
Patrol boat *Alcedo*	3030

BRITISH VESSELS

1 auxiliary cruiser *Orama*	3029
1 destroyer	3029
1 destroyer *G-29*	3036
1 destroyer *G-31*	3036

RUSSIAN VESSELS

1 destroyer	3044

GERMAN VESSELS

	PAGE
1 gunboat *Eber*	3029
1 auxiliary cruiser *Marie*	3029
6 destroyers	3044
2 submarines	3040

AUSTRIAN VESSELS

1 destroyer	2933

TURKISH VESSELS

1 destroyer	3050

DIPLOMATIC NOTES

FROM OCTOBER 18 TO NOVEMBER 18

PREPARED BY

A. F. WESTCOTT, PH. D., Instructor, U. S. Naval Academy

RUSSIA

BOLSHEVIKI IN POWER, KERENSKY OVERTHROWN.—On November 7, forces controlled by the Council of Workmen's and Soldiers' Delegates seized public buildings in Petrograd and drove the Kerensky government out of the city. Having gained control of the capital, the Maximalists proclaimed a cabinet, with their leader, Nikolai Lenine, as Premier and Leon Trotzky as Foreign Minister. One of the first acts of the new government was to issue a proclamation (November 9), approved by a special "All-Russian" Congress of Workmen's and Soldiers' Delegates, stating the two cardinal policies: (1) That the government would propose an armistice "to come into force at once on all fronts"; and (2) that it would "assure the free return of all private, state and ecclesiastical lands to the peasants' committees." The proclamation called on the army to resist the opposition organized by General Korniloff, Kerensky and Kaledines.

Petrograd, November 9.—"We plan to offer an immediate armistice of three months, during which elected representatives from all nations, and not the diplomats, are to settle the questions of peace," said Nikolai Lenine, the Maximalist leader, in a speech before the Workmen's and Soldiers' congress to-day.

"We offer these terms," M. Lenine added, "but we are willing to consider any proposals for peace, no matter from which side. We offer a just peace, but will not accept unjust terms. This war cannot be ended by one side only."

On a raised platform in the commencement room of the Smolny Institute, the headquarters of the revolutionary government, Leon Trotzky was seated, carefully groomed, smiling and triumphant in workman's garb. Nikolai Lenine, quiet, reserved, and studious, was beside him. Near them was Mme. Kollonty, young, attractive, and earnest. The others of the present controlling government of Petrograd were grouped about them. The room was crowded with delegates, soldiers predominating. There were also a number of sailors seated among the peasant delegates. The leaders outlined the aims and decisions of the Military Revolutionary Committee as follows:

"The abolition of capital punishment, the immediate release of all soldiers arrested by the Kerensky government for political offences, all members of the Kerensky government to be arrested, and all the revolutionary committees ordered to arrest Kerensky himself and to punish those aiding him to escape.—*N. Y. Times*, 10/11.

While the speedy downfall of the Bolsheviki government was widely prophesied, their forces on November 18 retained control of Petrograd and outlying districts of Moscow. Fighting had continued throughout the preceding week between Bolsheviki and Kerensky forces. Reports indicated that Kerensky was without popular following and that the position

of the Bolsheviki leaders was little stronger. Separate emergency governments had been set up by Cossack leaders in the provinces north of the Caucasus.

SMALL VOTE FOR BOLSHEVIKI.—Petrograd, October 31.—The non-partisan and conservative socialist groups have won sweeping victories over the radical Bolsheviki candidates in the municipal elections in most of Russia, according to returns from 643 cities and towns.

In the larger cities the average Bolsheviki vote was only 7 per cent, while in the smaller towns it was 2.2 per cent. About 50 per cent of the vote in the smaller towns was cast by no-party groups, considered largely bourgeoisie.

GERMANY

VON HERTLING SUCCEEDS MICHAELIS.—Dispatches of November 1 confirmed the appointment of Count George F. von Hertling, Bavarian Premier, to the position of German Imperial Chancellor and Prime Minister of Prussia. It was at first reported that the offices of Chancellor and Prussian Premier would be separated and that Michaelis would retain the latter; but the pressure of the Left in the Reichstag forced Michaelis from both positions. By the present arrangement, the bills for Prussian suffrage reform, which are said to have been explicitly promised, will be put through by a Bavarian.

In the theory of the German Constitution the Chancellor is not only the agent of the Kaiser, but also the head of the Prussian delegation in the Federal Council, the upper and dominant house of the imperial legislature. As Chancellor he is the sole plenary Minister of State, appointed by the Kaiser, and dividing with him the functions which the President performs in this country; responsible to the Kaiser alone, and as supreme over the Ministers of Foreign Affairs, Marine, etc., as the President is over the members of his Cabinet. But he is not only the instrument of the Kaiser, as Kaiser, but also as King of Prussia, and in this capacity he presides over the Prussian Ministry as well as leads the delegation which voices the wish of the King of Prussia in the Federal Council. Every Chancellor since Bismarck has also held both positions at the outset of his term, though Caprivi, Bismarck's immediate successor, resigned the presidency of the Prussian Council of Ministers two years before he was dismissed as Chancellor. This is not the first time a Bavarian has held the Chancellorship. Prince von Hohenlohe, Chancellor from 1894 to 1900, was a Bavarian by birth, and at the time of the unification of the north and south of Germany, in 1871, was Bavarian Premier, and a strong influence in bringing the sections of the nation together.

The appointment of a Bavarian and a Catholic to the Chancellorship may be taken as a clever concession to non-Prussian states in the Empire and as a means of winning over the Catholic Center Party. It was made safe by the fact that Bavaria, with seven votes in the Bundesrat, has always supported Prussia in opposition to popular government and ministerial responsibility to the lower house.

REICHSTAG ASSERTS ITSELF.—In spite of von Hertling's doubtful zeal for reform, the cabinet change is regarded as a Radical victory. Before taking office, von Hertling found it necessary to consult party leaders in the

Reichstag, and agreed to the resignation of Vice Chancellor Helfferich, a thorn in the side of the Socialists, and the appointment of the Progressive Friederich von Payer in his place. In the new cabinet all factions save the Conservatives are represented, and it has the support of the Centrists and Liberals. Considering the attention paid the Reichstag, the Centrist leader, Erzberger, hailed the change, somewhat prematurely, as the inauguration of a parliamentary régime. Whether it may be taken as a temporary compromise or a permanent concession will depend on military results.

VON HERTLING'S VIEWS.—Von Hertling has been known as strongly opposed to the idea of a Chancellor responsible to Parliament. This opposition is based on his fear that such a development would weaken the federative principle in the Empire and with it the exceptional rights which the Federal Constitution confers on Bavaria.

Further indication of the disposition of the imperial authorities to conciliate Bavaria, and of von Hertling's attitude with regard to this, may be found in a speech which he made, October 10, in the Main Committee of the Bavarian Lower House. As reported by Reuter, this statement also indicates the extent to which von Hertling's leaning toward a "moderate" peace may extend. In discussing the question of the "dis-annexation" of Alsace-Lorraine, he expressed himself unmistakably in favor of the division of this imperial territory, suggested last spring, between Prussia and Bavaria.

"Of the sacrifice of this German territory," he said, "there can be no talk. In the question of Alsace-Lorraine, Bavaria must represent not Bavarian, but German views. According to Bavarian views the union of Alsace with South Germany and of Lorraine with Prussia would be expedient, but the idea of autonomy is a great mistake, and would not produce any reconciliation with France.

"It is not yet time," he also said," for Germany to make any declaration with regard to her pawn, Belgium. In all the circumstances she must take care to obtain political and economic guarantees against the future hostility of Belgium, but we must proceed with moderation and with consideration for the wishes of the Belgian people."

Last spring von Hertling was credited with responsibility for the publication in the Bavarian *Staats-Zeitung* of an article in which it was set forth that Germany did not need to seek indemnities from her foes, but must insist on the restoration of full commercial privileges.

The Bavarian statesman is 74 years old, and has been unwilling to take the post of Imperial Minister on account of his age. He was born in Darmstadt in 1843. He studied at Münster, Munich, Berlin, and in Italy. and in 1882 became a professor of philosophy at Bonn. He served in the Reichstag from 1875 to 1890 and from 1896 to 1898. In 1912 he was made Bavarian Minister of Foreign Affairs and Prime Minister.

Among his works are: *Matter and Form and Aristotle's Definition of the Soul, The Limits of the Mechanistic Interpretation of Nature, John Locke and the Cambridge School, The Principles of Catholicism and Science,* and a study of Albertus Magnus.—*N. Y. Times,* 31/10.

GERMAN FREEDOM OF THE SEAS.—F. Sefton Delmer, late English lecturer in Berlin University, and recently escaped from internment in Germany, gave to the *London Times* the following extract from a speech made by Count zu Reventlow at the Berlin Philharmonic Hall in March, 1917. If correctly reported, it may be taken as a German exposition of "freedom of the seas":

"What do we Germans understand by the freedom of the seas?" he said. "Of course we do not mean by it that free use of the sea which is the common privilege of all nations in times of peace, the right to the open highways of international trade. That sort of freedom of the sea we had before the war. What we understand to-day by this doctrine is that Germany should possess such maritime territories and such naval bases that at the outbreak of a war we should be able, with our navy ready, reasonably to guarantee ourselves the command of the seas. We want such a jumping-off place for our navy as would give us a fair chance of dominating the seas and of being free of the seas during a war. [Cheers.] The inalienable possession of the Belgian seaboard is therefore a matter of life and death to us, and the man is a traitor who would faint-heartedly relinquish this coast to England. Our aim must be not only to keep what our arms have already won on this coast, but sooner or later to extend our seaboard to the south of the Strait of Calais."

GERMANY'S WAR DEBT.—The Seventh German War Loan, closed October 18, is announced to have yielded 12,430,000,000 marks, or nominally about $3,107,500,000. The total war debt of Germany is now $18,104,000,000, on which the annual interest is, roughly, $900,000,000.

On the other hand, the net revenue of Germany for the year ended March last was barely $700,000,000. Thus the interest on the war debt exceeds the present revenue by $200,000,000, and exceeds by nearly $50,000,000 the entire imperial revenue in the last year before the war. (Condensed from *N. Y. Nation*, financial column, November 1, 1917.)

ITALY

BOSELLI CABINET RESIGNS.—The retreat of Italian military forces precipitated the downfall of the Boselli Cabinet on October 26. A new government was organized by Vittorio Orlando, who was Minister of the Interior in the old Cabinet and who by his use of this position was largely responsible for preceding Cabinet crises. The Ministry of the Interior carries with it the appointment of provincial governors and practical control of the internal government of Italy. In the new Ministry, which was announced October 30, Premier Orlando retains the portfolio of the Interior. The continuance of Baron Sonnino as Minister of Foreign Affairs is taken as insuring no change in Italy's foreign policy or weakening in her attitude toward the war.

Vittorio Emanuele Orlando, the Minister of the Interior of the late Boselli Cabinet, although recognized as one of the most subtle statesmen in Italy, had already, because of the portfolio he held, provoked three crises in the government, the last of which has carried him into the Premiership.

Usually the portfolio of the Interior is held by the Premier—it was so in Giolitti's time and thereby placed within his gift the appointment of the 69 prefects or provincial governors, through whom he practically ruled Italy.

Orlando began his career as a Sicilian lawyer, and as Deputy from Palermo was early discovered by Giolitti; but he broke with the "big boss," as did many others, when Italy entered the war.

From 1903 to 1905 he was Minister of Education in the second Giolitti Ministry. Again, under Giolitti, he was Minister of Justice between 1907 and 1909, and for the last three years he has sat in war cabinets under Signor Salandra.—*N. Y. Times*, 31/10.

ITALY'S DIFFICULTIES.—The correspondent, Charles H. Grasty, writes as follows:

"Rome, November 13.—To understand the present situation in Italy it is necessary to consider three essential facts:

"The first is geographical. The remark is attributed to Napoleon: 'Italy is a wonderful country, but too long.' From Turin to Naples and back is as long a trip for a Caproni as from Turin to London.

"The second fact is racial and dynastic. The Kingdom of Italy is only 50 years old, composed of units widely separated and differing in race and historic antecedents.

"Third, there is a kingdom within a kingdom. The Vatican is in Italy, but not of it. No one can grasp the present condition without realizing that in Italy there occupy the same ground two separate and inherently antagonistic powers—one spiritual with the temporal in retrospect and prospect, and the other purely temporal. Their subjects are the same, for practically all Italy is Catholic. History has bequeathed this condition.

"If all Italy had the spirit of Milan no question would arise as to its power of resistance to the German invasion or a separate peace. There is no white feather in Milan. The Milanese will die, if necessary, in the proud belief that their city is the center of Italy's will to war.

"Rome is a different story. There is no danger here of actual German murder and pillage. The censorship is strict, and the masses are ignorant of the seriousness of the northern situation. Furthermore, Rome lives much in the past, and her climate is relaxing. Rome has a great many 'knockers.' There are circles which take pride in holding 'well-balanced' views. From such sources flows a constant stream of cynical sanity which is destructive of the war spirit.

"Baron Sonnino by common consent is Italy's leading figure. He is of Jewish origin, and English on his mother's side. He has never once talked to a newspaper man, even privately, and is the most aloof of all the world's statesmen. Sonnino's brilliant mind illuminates everything within a certain radius, but the circle on which he throws its light is small."—*N. Y. Times*, 14/11.

FRANCE

FALL OF PAINLEVÉ CABINET.—On October 23 Premier Painlevé accepted the resignation of M. Ribot, the veteran Minister of Foreign Affairs, and put in his place M. J. Louis Barthou. The change, made apparently as a result of Socialist opposition to Ribot's firm foreign policy, failed to strengthen the Painlevé Cabinet, which resigned on November 13.

Paris, November 13.—The Painlevé Ministry resigned to-night, following its defeat in the Chamber of Deputies by a vote of 277 to 186, after a prolonged debate on the new Allied War Council and other questions. The Socialists refused to support the government.

Premier Painlevé read a defence of the new War Council, after which he said that he accepted discussion of the government's diplomatic and military, but not interior, policy. The question of the current scandals being thus barred, Abel Ferry condemned the War Council as merely an inter-Allied secretarial bureau.

After a heated discussion on various interpellations, Premier Painlevé put the question bluntly: "Has the present government the confidence of the Chamber? Has it the necessary authority to represent France at the coming Allied conference?"

The government then received a vote of confidence, 250 to 192, a majority of 58, but about 100 members, nearly all of whom were Socialists, abstained from voting. On a subsequent vote the government was defeated, M. Renaudel announcing that the Socialists could not support the Cabinet.—*N. Y. Times*, 14/11.

The downfall of the Painlevé Ministry, like that of the Ribot Ministry, was due to the refusal of Socialist elements either to share in the government or give it whole-hearted support. Their policy was rather to force resignations by passive opposition. However complicated by spy scandals and internal disputes, the opposition of the Socialists seems to have been in reality directed against government war aims and policies.

CLEMENCEAU HEADS NEW GOVERNMENT.—M. Georges Clemenceau was called upon to form a new Cabinet, and on November 16, after less than 24 hours, announced its make-up as follows:

Premier and Minister of War—GEORGES CLEMENCEAU.
Minister of Foreign Affairs—STEPHEN PICHON.
Minister of Justice—LOUIS NAIL.
Minister of Interior—JULES PAMS.
Minister of Finance—LOUIS KLOTZ.
Minister of Marine—GEORGES LEYGUES.
Minister of Commerce—ETIENNE CLEMENTEL.
Minister of Public Works—ALBERT CLAVELLE.
Minister of Munitions—LOUIS LOUCHEUR.
Minister of Instruction—LOUIS LAFFERRE.
Minister of Colonies—HENRY SIMON.
Minister of Labor—M. COLLIARD.
Minister of Provisions—VICTOR BORET.
Minister of Blockade and Invaded Region—CHARLES C. A. JONNART.

M. Clemenceau, nicknamed "the Tiger," is 76 years of age. He has been conspicuous in the present war chiefly for his slashing editorials in *L'Homme Libre*, later *L'Homme Enchaîné*. He led in the defence of Dreyfus, and was Premier from 1906 to 1909, during which period, in spite of his consistent radical Republicanism, he put down labor troubles with an iron hand. This will insure Socialist opposition in the future.

M. Clemenceau's Cabinet is predominantly radical Republican, with no Conservatives, no Royalists, and no Socialists. Four ministers—Klotz, Clementel, Clavelle and Loucheur—hold over from the preceding Cabinet. The new ministers are characterized as uncompromising fighters, like their leader.

THE FUTURE OF ALSACE-LORRAINE.—*The London Times* of October 12 and 13, published a long article from an Alsatian correspondent in favor of the retrocession of Alsace-Lorraine to France. Briefly stated, the points made were these:

Historical.—The German plea that the two provinces once belonged to the Holy Roman and Germanic empires, is more than counterbalanced by their subsequent long connection with France. The question, however, is one not of ancient history but of practical politics, looking to the future safety of Europe and the world. In 1815 the second Peace of Paris transferred the provinces on the left bank of the Rhine from France to Prussia, with the definite object of checking the aggressiveness of France, at a time when the future power and predatory aims of Prussia were unsuspected. For this aggrandisement of Germany the rest of Europe was responsible. Germany has now a population nearly double that of the country against whose ambitions she was strengthened in 1815. The tables are turned.

In 1871 Europe remained passive while Germany annexed another slice of France and added another million and a half to her already large population. This was not a question of adjusting the European balance; it was sheer plunder at which the other powers stood by with folded hands.

Industrial.—By the acquisition of 1871 Germany gained some of the most valuable of French iron mines and two-thirds of her blast furnaces—an invaluable supplement to the conveniently adjacent coal fields of the Sarre basin, seized in 1815. Aside from the Sarre coal fields, Germany already possessed more than half the coal reserve of the Continent. The Briey-Longwy iron fields were therefore of far greater value, because the German iron fields east of the Rhine are so limited that of the 28 million tons of iron ore extracted from German soil in 1913, 21 million came from Lorraine. "Without those 21 millions and the many more millions of which they were the successors, the war would probably never have been begun. Without the further millions brought to the surface during the war—if only the French could have made an advance of three miles on a front of 10, so as to have occupied the German part of the mining area, instead of being compelled by the suddenness of the attack to retire and leave their own at the mercy of the enemy—it could never have been continued. That was the worth of the Briey-Longwy iron mines to the German marauders."

The following table, from the *Quarterly Review*, October, 1917, gives the percentage of iron from the Lorraine district:

OUTPUT OF RAW IRON ORE

	German Empire	Lorraine District Alone
No. of mines in working	340	46
Output of iron ore in raw state	22,964,800 metric tons	16,652,000 metric tons = 72.5%
Estimated quantity of iron	6,940,400 "	4,789,900 " = 69.0%
Value at mines (in marks)	92,272,000 m.	45,155,000 m. = 48.9%

Continuing, the article points out that the 1871 frontier brought Germany within easy striking distance, through Luxemburg and Belgium, of the chief coal and iron districts of France, so that after the Battle of the Marne, 90 per cent of French iron, 86 per cent of her cast iron, 78 per cent of her coal, and 76 per cent of her steel, remained in German hands, besides 95 out of 127 blast furnaces. Thus Germany had not only all her own coal and iron output, but 83 per cent of France's.

Plebiscite Unfair.—The article argues against a plebiscite in view of the 400,000 German *immigrés*, and the thousands of true Alsatians and Lorrainers who have left the provinces. "The whole problem of the future position in Europe of the two provinces is of such tremendous import to the peace of the world that it can be settled in only one way. They must be given back to France."

GREAT BRITAIN

NORTHCLIFFE REJECTS AIR POST.—In a letter to Premier Lloyd George on November 15, Lord Northcliffe declined to take control of the new British Air Ministry. His letter, which he at once published, gives the following bright picture of conditions as he saw them in America:

"Returning after five months spent in the virile atmosphere of the United States and Canada, I find that, while these two countries are proceeding with their war preparations with a fervor and enthusiasm little understood on this side of the Atlantic, while the United States instantly put into operation conscription, over which we wabbled for two years, and is making short work of sedition mongers; while Canada already has given such proofs of thoroughness as the disfranchisement of conscientious objectors and the denaturalization of all enemy aliens naturalized within the last 15 years; while we, for our part, are asking immense sacrifices from those peoples, there are still in office here those who dally with such urgent questions as that of unity of war control, eradication of sedition, mobilization of the whole man and woman power of the country, and the introduction of compulsory food rations.

"I had personal experience while in America of the obstruction and delay in certain departments in London, which, for example, postponed sending Lord Reading's vital and most successful mission. I find the censorship still being misused, and that men in various positions of authority, who should have been punished, have been retained and in some cases elevated.

"The spirit of the men and women of Great Britain is clearly as eager and splendid as ever. We have, in my belief, the most efficient army in the world, led by one of the greatest generals, and I am well aware of the fine achievements of many others of our soldiers, sailors and statesmen, but I feel in the present circumstances I can do better work if I maintain my independence and am not gagged by a loyalty that I do not feel toward the whole of your administration."—*N. Y. Times*, 16/11.

As a result of the offer to Lord Northcliffe, revealed by his published reply, Viscount Cowdray, head of the old Air Board, resigned on November 16.

ALLIED WAR COUNCIL.—On his return from Italy Premier Lloyd George announced, on November 14, the agreement of Great Britain, France and Italy for an inter-Allied War Council, on the following terms:

"First.—With a view to better coordination of the military action on the western front, a Supreme War Council is composed of the Prime Minister and a member of the government of each of the great powers whose armies are fighting on that front, the extension of the scope of the council to other fronts to be reserved for discussion with the other great powers.

"Second.—The Supreme War Council has for its mission to watch over the general conduct of the war. It prepares recommendations for the consideration of the government and keeps itself informed of their execution and reports thereon to the respective governments.

"Third.—The General Staff and military commands of the armies of each power charged with the conduct of the military operations remain responsible to their respective governments.

"Fourth.—General war plans drawn by competent military authorities are submitted to the Supreme War Council, which under high authority of government insures its concordance and submits, if need be, any necessary changes.

"Fifth.—Each power delegates to the Supreme War Council one permanent military representative, whose exclusive function is to act as technical adviser to the council.

"Sixth.—Military representatives receive from the government and the competent military authorities of their country all proposals, information and documents relating to the conduct of the war.

"Seventh.—The military representatives watch day by day the situation of the forces and the means of all kinds of which the Allies and enemy armies dispose.

"Eighth.—The Supreme War Council meets normally at Versailles, where the permanent military representatives and staffs are established. They may meet at other places according to circumstances. Meetings of the Supreme War Council take place at least once a month."

Sharp criticism of this council was voiced in both England and France on the grounds: (1) That it threatened civilian control and interference in strictly military matters; (2) that it did not go far enough in the direction of unified military control of all fronts. Answering these objections in the House of Commons, Premier Lloyd George read the terms of the agreement, and added the following explanation:

"From the foregoing it will be clear that the council will have no executive power, and that final decisions in the matter of strategy and the distribution and movements of the various armies in the field will rest with the several governments of the Allies. There will therefore be no operations department attached to the council. The permanent military representatives will derive from the existing intelligence departments of the Allies all information necessary in order to enable them to submit advice to the supreme Allied council.

"The object of the Allies has been to set up a central body charged with the duty of continuously surveying the field of operations, as a whole, by the light of information derived from all the fronts, and from all the governments and staffs, and of coordinating the plans prepared by the different general staffs, and, if necessary, of making proposals of their own for the better conduct of the war."—*N. Y. Times*, 16/11.

DEATH OF SULTAN OF EGYPT.—The Sultan of Egypt, Hussein Kamel, died October 9, 1917, at the age of 64. He ascended the throne in December, 1914. Sultan Hussein is succeeded by his younger brother, Prince Ahmed Fuad, who was born in 1868 and was educated in Italy. He has been consistently well disposed toward British control.

UNITED STATES

U. S. DELEGATES TO PARIS WAR CONFERENCE.—On November 7 Secretary Lansing announced the arrival in England of the American Commissioners to the Allied War Conference, scheduled to meet in Paris in the latter part of November. Secretary Lansing's statement was, in part, as follows:

"The government of the United States will participate in the approaching conference of the powers waging war against the German Empire, and has sent as its representative Edward M. House, who is accompanied by Admiral W. S. Benson, Chief of Naval Operations; General Tasker H. Bliss, Chief of Staff, U. S. A.; Oscar T. Crosby, Assistant Secretary of the Treasury; Vance McCormick, chairman of the War Trade Board; Bainbridge Colby, United States Shipping Board; Dr. Alonzo Taylor, representing the Food Controller; Thomas Nelson Perkins, representing Priority Board, and Gordon Auchincloss, as secretary.

"The conference is essentially a 'war conference' with the object of perfecting a more complete coordination of the activities of the various nations engaged in the conflict and a more comprehensive understanding of their respective needs, in order that the work of the co-belligerents may attain the highest war efficiency. While a definite program has not been adopted, it may be assumed that the subjects to be discussed will embrace not only those pertaining to military and naval operations, but also the financial, commercial, economic and other phases of the present situation which are of vital importance to the successful prosecution of the war.—*N. Y. Times,* 7/11.

Washington, November 16.—It became known to-day that three separate conferences, in all of which the United States will participate, would be held in Paris. The general conference, in which Colonel House will represent the United States, will be devoted to the whole question of coordinated effort in the conduct of the war. Another conference will be devoted to plans for military cooperation, with General Bliss, Chief of the General Staff, as the American representative, and the third to plans for naval cooperation, with Admiral Benson, Chief of Naval Operations, representing this government.—*N. Y. Times,* 16/11.

The President's mission has arrived in stormy times. It seems odd that the quiet man who a few years ago directed a bank in Austin, Texas, should now be the bearer of encouragement and reassurance to all civilized Europe, but it is the literal fact. Never in history has any foreigner come to Europe and found greater acceptance or wielded more power. Behind this super-Ambassador, whose authority and activities are unique, stands the President, now rated in Europe as the world's greatest living statesman, and behind the President stands the country whose measureless resources and unshakeable will are counted a sure shield against the successful sweep of Prussianism.—C. H. Grasty, *N. Y. Times,* 18/11.

WAR ON AUSTRIA ADVOCATED.—In view of Italy's military setback, an American declaration of war against Austria has been widely advocated as a measure essential to effective support of Italy. Speaking at Princeton on November 16, Mr. Roosevelt said:

"We announced that our purpose was to make the world safe for democracy. This pledges us to immense sacrifice in a hard, dangerous crusade, eminently righteous, but for an object in which our own concern was slight. Personally, I was and am eagerly ready to enter into such a crusade, if our people seriously intend to put it through, but our people ought thoroughly to understand what it means. Our grievance was against Germany, and we could with honor have joined with our allies to war against her until she was overthrown and then make peace in such fashion as to guarantee justice to them and to us, and to make the world a little safer for all of its inhabitants. But a pledge to 'make the world safe for democracy,' is a solemn engagement to smash the two nations which most conspicuously make democracy unsafe within their own borders, Austria and Turkey."

AGREEMENT BETWEEN UNITED STATES AND JAPAN.—On November 6 Secretary Lansing published the text of an important agreement between the United States and Japan with regard to China. The agreement "recognizes that Japan has special interests in China, particularly in the part to which her possessions are contiguous"; but at the same time it declares the adherence of both governments "to the principle of the so-called 'Open Door.'" Identic letters were exchanged between Secretary Lansing and Viscount Ishii, special Japanese Ambassador, as follows:

DEPARTMENT OF STATE, WASHINGTON, November 2, 1917.

Excellency.—I have the honor to communicate herein my understanding of the agreement reached by us in our recent conversations touching the questions of mutual interest to our governments relating to the Republic of China.

In order to silence mischievous reports that have from time to time been circulated, it is believed by us that a public announcement once more of the desires and intentions shared by our two governments with regard to China is advisable.

The governments of the United States and Japan recognize that territorial propinquity creates special relations between countries, and, consequently, the government of the United States recognizes that Japan has special interests in China, particularly in the part to which her possessions are contiguous.

The territorial sovereignty of China, nevertheless, remains unimpaired, and the government of the United States has every confidence in the repeated assurances of the Imperial Japanese Government that, while geographical position gives Japan such special interests, they have no desire to discriminate against the trade of other nations or to disregard the commercial rights heretofore granted by China in treaties with other powers.

The governments of the United States and Japan deny that they have any purpose to infringe in any way the independence or territorial integrity of China, and they declare, furthermore, that they always adhere to the principle of the so-called "open door," or equal opportunity for commerce and industry in China.

Moreover, they mutually declare that they are opposed to the acquisition by any government of any special rights or privileges that would affect the independence or territorial integrity of China, or that would deny to the subjects or citizens of any country the full enjoyment of equal opportunity in the commerce and industry of China.

I shall be glad to have your Excellency confirm this understanding of the agreement reached by us.

Accept, Excellency, the renewed assurance of my highest consideration.

ROBERT LANSING.

THE AGREEMENT EXPLAINED.—Commenting on the note, Secretary Lansing explained that it served to remove mutual suspicion, which had been stirred up by enemy efforts to alienate the two countries. It also expressed Japan's whole-hearted desire to cooperate in the war against Germany.

According to statements by Japanese diplomats, Japan's special interests in China are already recognized by treaties between Russia and Japan and between Great Britain and Japan. In other respects, the note reaffirms the Root-Takahira "gentlemen's agreement" of November 30, 1908, pledging the two nations to respect each other's Pacific possessions and support the principle of the Open Door.

CHINA NOT BOUND.—On November 13 Secretary Lansing made public a note from China which, without protesting against the Lansing-Ishii pact, announced that "the Chinese Government will not allow itself to be bound by any agreement entered into by other nations."

JAPANESE DEMANDS ON CHINA.—Peking, October 26.—The Japanese are exerting every effort, officially and unofficially, to close the Chinese arms monopoly contract, carrying control of the Nanking iron deposits and the employment of Japanese military advisers and a director of the new arsenal at Nanking. It is asserted by the Japanese that they are extending credit, and not making a loan, and consequently that they are not violating the six powers' exclusive rights to make political loans.

This view is not shared by the French and the English and a large section of the Chinese press, as well as diplomatic circles, which unite in denouncing the deal as a revival of the most objectionable features in Japan's demands presented to China in May, 1915, known as "Group V." The principal provisions of those demands, which were 21 in number, concerned the appointment of Japanese military and political advisers for China and Japanese supervision over the manufacture or purchase by China of munitions of war.

Minister Reinsch has advised the Foreign Office that China has invariably taken the position that it would hold the remainder of the iron deposits for national use whenever Americans have sought development rights, and that consequently the United States now would insist that American interests be given consideration in the Chinese iron industry. The ministers of several other countries have taken the same position.

SOUTH AMERICA

BRAZIL DECLARES WAR ON GERMANY.—On October 26 President Bray, of Brazil, proclaimed a state of war with Germany, following a unanimous vote in favor of such action in the Senate and a vote in the Chamber of Deputies of 149 to 1. On November 7 the Chamber of Deputies passed a series of supplementary measures against Germany, including annulment of German contracts for public works, control of German banks and firms, and internment of German suspects.

The army has been concentrated in Rio Grande do Sul. Plans are being pushed to increase the Brazilian Army to 100,000 and adopt conscription instead of voluntary service.

GERMAN PLOTS REVEALED.—On October 30 Secretary Lansing published two additional intercepted dispatches from Count Luxburg at Buenos Aires to the Berlin Foreign Office, revealing German plans to make use of the German population in southern Brazil and to stir up dissension among South American states. The dispatches, phrased in the count's inimitable style, follow:

No. 63. July 7, 1917.—Our attitude toward Brazil has created the impression here that our easy-going good-nature can be counted on. This is dangerous in South America where the people under thin veneer are Indians. A submarine squadron with full powers to me might probably still save the situation. I request instructions as to whether after a rupture of relations legation is to start for home or to remove to Paraguay or possibly Chile. The naval attaché will doubtless go to Santiago de Chile.

LUXBURG.

No. 89. August 4, 1917.—I am convinced that we shall be able to carry through our principal *political aims* in South America, the maintenance of open market in Argentina and *the reorganization of South Brazil equally well whether with or against* Argentina. Please cultivate friendship with Chile. The announcement of the visit of a submarine squadron to salute the President would even now exercise decisive influence on the situation in South America. Prospect excellent for wheat harvest in December.

LUXBURG.

WEALTH AND MAN-POWER OF WARRING NATIONS.—The following tables are from *The Balance Sheet of the Nations at War*, compiled by the Bankers' Trust Co. and published in the *N. Y. Times* of October 28:

WEALTH AND DEBT

	National Wealth	National Debt	P. C. of Debt to Wealth
Entente Allies and United States:			
United Kingdom	$85,000,000,000	$23,500,000,000	27.6
Canada	65,000,000,000	1,100,000,000	5.4
Newfoundland		35,000,000	
Australia		795,000,000	
New Zealand		830,000,000	
Union of South Africa		800,000,000	
Total British Colonies		3,560,000,000	
France	62,000,000,000	20,000,000,000	32.3
Italy	25,000,000,000	6,000,000,000	24.0
Japan	28,000,000,000	1,300,000,000	4.6
Portugal	5,000,000,000	1,100,000,000	22.0
United States	225,000,000,000	4,500,000,000	2.0
Russia (excluding Poland)	58,000,000,000	24,000,000,000	41.4
Total	$553,000,000,000	$83,960,000,000	14.7
Teutonic Allies:			
Germany	$82,000,000,000	$20,000,000,000	24.4
Austria-Hungary	40,000,000,000	16,000,000,000	40.0
Turkey	8,000,000,000	1,500,000,000	18.7
Bulgaria	4,000,000,000	1,000,000,000	25.0
Total	$134,000,000,000	$38,500,000,000	28.7
Entente Allies and United States	80.5%	68.5%	
Teutonic Allies	19.5%	31.5%	

FIGHTING STRENGTH

	Original Man Power 18 to 45	Present Man Power	Army-Navy Present Estimated Strength	P. C. Present Man Power
Entente Allies and the United States:				
United Kingdom	12,000,000	13,800,000	6,000,000	49.71
Canada, Newfoundland, Australia, New Zealand, Union of South Africa	3,220,000		860,000	
France	9,000,000	6,500,000	3,000,000	46.1
Italy	8,000,000	7,700,000	3,000,000	38.9
Japan	10,500,000	10,500,000	1,500,000	14.2
Portugal	1,200,000	1,200,000	400,000	33.3
United States	22,000,000	22,000,000	1,640,000	7.4
Russia (excluding Poland)	34,000,000	30,000,000	5,000,000	16.6
Total	99,920,000	91,700,000	21,400,000	23.3
Teutonic Allies:				
Germany	14,000,000	9,400,000	6,100,000	64.9
†Austria-Hungary	12,000,000	11,150,000	3,400,000	30.5
†Turkey	4,000,000	3,500,000	1,000,000	28.6
†Bulgaria	1,000,000	1,000,000	500,000	50.0
Total	31,000,000	25,050,000	11,000,000	43.9
Entente Allies and United States	76.3%	78.5%	66.0%	
Teutonic Allies	23.7%	21.5%	34.0%	

†Figures for these countries especially unreliable.

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"Japan in World Politics." By K. K. Kawakami, $1.50 net. (New York: The MacMillan Company.)

This is the author's third book on kindred subjects and while he has been long a resident of this country the point of view is thoroughly Japanese. While the title does not reveal it the book is evidently written principally for the American public. The part dealing with the relations of Japan to Europe aims to explain the Japanese side of the Japanese-Chinese-European situation. It is, perhaps, the least convincing part of the book.

The principal interest to western readers will be the Japanese views of our international relations more particularly with regard to the various phases of the immigration question. Americans generally know that the Japanese are not satisfied with the United States attitude as to Japanese entering United States. Not many of us know definitely why this is so. The author tells us why and this is the most valuable part of the book. The amicable settlement of this question—Japanese Immigration—will only come when we understand their ideas, viewpoint and desires, and they ours. Books such as this will help us to this end. The reader feels quite frequently that the author, speaking from the Japanese viewpoint, is smarting under what he feels are unjust or unwarranted American assumptions. He says, "The East acquiesces only because it is powerless to do otherwise."

Mr. Kawakami presents himself with very definite socialistic sympathies and the reader's attention is perhaps too frequently called to this fact. The relations of labor and capital on the west coast are certainly closely bound up with the solution of this immigration question, but the author seems to fail to realize that it is the attitude of organized labor and not that of capital which is responsible for most of our difficulties over this question. The brotherhood of labor in America against the brotherhood of labor in Japan. A very wide divergence from the author's, "To me, moreover, Socialism was nothing if it was not internationalism" and at another place "freedom of migration of all peoples from one country to another." However, for one seeking information on the subject with which it deals the book is timely and valuable. A. St.C. S.

"The Solution of Tactical Problems." By Lieut. Colonel J. Layland Needham. $2.00. (New York: E. P. Dutton & Co.)

The author has added to the list of works on military subjects a 277-page book, which ought to prove valuable in the purpose for which it was produced, that is assisting younger officers in preparing for examinations

in tactical problems. The method of presentation will greatly assist those of limited experience in such work in familiarizing themselves with the methods of and reasons, for the various actions connected with the maneuvering of troops, and, also, the fundamental principles involved.

The book does not indulge in a detailed discussion of any subject or principle, nor does it lay down any fixed rule for the solution of problems, but rather outlines to the reader the various details included in the general idea.

Operations involving tactical problems are conveniently and logically divided into the various classes as regards object or mission; these classes are then taken separately and, where appropriate, are further classified within themselves with regard to special situations.

The value of the work lies largely in the delineation of the series of *steps* involved in each operation, and the brief comments on each step. This scheme enables the student to follow the proper sequence of the essentials of tactical operations, and as he follows the steps outlined, and studies the comments thereon, he is assisted in applying his reasoning powers toward a decision.

The book probably will also prove useful to officers who have had more experience in this work, by serving as a reminder on numerous points that are stored in their minds, but which may be overlooked unless frequent reference is made to them.

A part of the work is properly allotted to the auxiliary subjects of reports, quarters, orders, engineering and the characteristics of the three arms, these subjects being intimately connected with those composing the main object of the book.

The specimen questions for examination cover the work fairly well. There is, of course, a tendency in some individuals to study a subject *from* such questions, but to those to whom a subject appeals, and in whom a real desire for knowledge on the subject exists, the questions furnish considerable help in connection with the study.

The present unfortunate conditions under which we find ourselves, with thousands of untrained troop commanders being hurriedly prepared for leadership, render it important that each one waste no time on non-essentials. Like any other profession, that of troop leading cannot be wholly obtained from one book, nor one hundred books, but requires long practice in the field with mind and eye constantly applying themselves to conditions, both actual and imaginary. But for an intelligent understanding of *what* to see and *what* to imagine, the beginner must have a clear outline of the principles involved in, and the "cause and effect" of tactical operations. This book furnishes briefly, but clearly, the outline and leaves to the reasoning power and other abilities of the student the details of working out the solution. A. R.

"Secrets of the Submarine." By Marley F. Hay. $1.25. (New York: Dodd, Mead & Co.)

This book is intended for the non-technical reader. The fact that the author has spent the last 17 years in the design and construction of

submarines, and that a number of boats of his design are in the service of the Dutch and Danish navies is sufficient to make his statements authoritative.

The author states in his preface that he discusses no question that has not been propounded to him by persons of education and intelligence at least in some branch of knowledge.

Anyone who has seen duty with submarines is familiar with the questions that are asked about submarines. He is inclined to designate many as "fool" questions but a great many naval officers are among those asking these questions. A few of the simpler which are well answered in this book are the following typical ones: "Doesn't the splashing of sea water against the upper prism of the periscope obscure the image? How far can one see under water?"

The difficulties of combating the submarine are taken up and the common idea that a submarine can be seen easily from an aeroplane is exploded; or, at least, the rather rare conditions under which it is easy to see a submarine are explained.

In discussing the destruction of submarines the author mentions the fact, which must have occurred to many naval officers, that the oil film often reported may be nothing but the slick caused by the shell. He also notes that most German submarines have superstructure oil tanks which could be pierced without damage to the boat itself.

On the whole this book is a brief but comprehensive explanation of the design, equipment and operation of the modern submarine. In the present days when the submarine question is so much to the fore this book fills a long felt want. It should be on the shelves of every ship's and crew's library in the service. J. W. R.

"The Principles of Military Art." By Major Sir Francis Fletcher-Vane, Bt. $1.25 net. (New York: E. P. Dutton & Co.)

This book is not a discussion of tactical or strategic principles, but deals mainly with the principles governing the relations between those placed in command and their subordinates. It is particularly timely, in view of the large number of men now in training for the national army, and the greater number still to follow.

While the book is addressed to officers of all ranks, it is intended particularly for the young officers and men now under training, especially those who have not sufficiently considered the personal equation of those under their command. It deals exclusively with the army, but the same principles apply in handling men in any branch of the service.

The author has apparently had considerable experience in the field during the Boer War in South Africa, and in training troops for the present war. He points out some of the failures in the early training of the British Army during the present war, where the ardor of recruits was dampened by many hours of rigid drill daily, in antiquated close-order methods, taught by officers resurrected from the retired list and out of touch with the modern spirit of progress.

The book discusses the various phases in the training of troops, considered as individuals and human beings, not as unthinking automatons, and attempts to show "that loyalty must be reciprocal, and that true discipline is only created by sympathy and mutual service." The early chapters, discuss "drills," "tactics," "musketry," etc., giving general principles only. There is no attempt to treat any of these in detail. The remaining chapters deal with "discipline," "*esprit de corps*," "command," "courage," "observation," and kindred subjects.

The concluding chapter deals with "chivalry," and under this head the subject of retaliation for German "frightfulness" is discussed. This is particularly timely, in view of the increasing demand for reprisals. The book as a whole merits a careful reading. H. G. S. W.

"Secrets of Polar Travel." By Admiral Robert E. Peary. Price, $2.50. (New York: The Century Co., 1917.)

The book might almost be called a Manual of Arctic Life since it gives a careful description of the steps taken to adapt "the oldest and most perfect of all machines—the animal machine—man" to life amid the abnormal conditions that exist in the extreme north.

The headings of the chapters show how completely the ground is covered: Building a Polar Ship; Selecting Men; Supplies and Equipment; Ice Navigation; Winter Quarters; Polar Clothing; Eskimos and Dogs; Resources of the Country; Sledge Equipment; and Sledge Travel.

In each chapter the author discusses most interestingly the problems to be met and the best solutions as found in the light of his own extended experience and by comparison with the experiences of others. The book abounds in interesting, quotable features, but to begin to quote would result in reprinting the book.

The illustrations are many and excellent. A. N. B.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fourth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life members, given by proxy or presence, shall be cast, a majority electing.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be thirty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, $3.00; enlisted men, U. S. Navy, $2.00. Single copies, by purchase, 30 cents; issues preceding January, 1917, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1918

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay presented on any subject pertaining to the naval profession.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. The award for the prize will be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1918. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Board.

3. The successful essay to be published in the PROCEEDINGS of the Institute; and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the PROCEEDINGS of the Institute, after it leaves the hands of the Board.

4. If, in the opinion of the Board of Control, the best essay presented is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention" or such other distinction as the Board may decide.

5. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

6. An essay not having received honorable mention may be published also, at the discretion of the Board of Control, but only with the consent of the author.

7. The essay is limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

8. It is requested that all essays be submitted typewritten and in duplicate, if practicable; essays submitted written in longhand and in single copy will, however, receive equal consideration.

9. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

I. C. KIDD,
Lieutenant Commander, U. S. N., Secretary and Treasurer.

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC, PACIFIC AND ASIATIC FLEETS.

"The Mutual Relations of Gunnery and Tactics."

"The Place of the Naval Officer in International Affairs."

"The Evolution of Naval Doctrine from National Character."

"The Training of Enlisted Personnel to Produce Modern Man-o'-Warsmen: (a) Military Training; (b) Moral Training; (c) Education."

"The Organization, Employment and Training of Reserve Fleets and Flotillas."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut. Commander Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

Gunnery in Our Navy. The Causes of Its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure Its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut. Commander A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A Few Thoughts on Our Next Step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut. Commander Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

THE NATION'S DEFENCE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut. Commander Yates Stirling, U. S. N.

1909

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

THE NAVY AND COAST DEFENCE. Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.

THE REORGANIZATION OF THE NAVAL ESTABLISHMENT. Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.

A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR. Honorable Mention, 1910. By Lieutenant Lyman A. Cotton, U. S. N.

1911

Navy Yard Economy. Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.

NAVAL POWER. Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.

WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

Naval Might. Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).

INSPECTION DUTY AT THE NAVY YARDS. Honorable Mention, 1912. By Lieut. Commander T. D. Parker, U. S. N.

1913

The Greatest Need of the Atlantic Fleet. Prize Essay, 1913. By Lieut. Commander Harry E. Yarnell, U. S. N.

NAVY DEPARTMENT ORGANIZATION. A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.

TRAINED INITIATIVE AND UNITY OF ACTION. Second Honorable Mention, 1913. By Lieut. Commander Dudley W. Knox, U. S. N.

1914

The Great Lesson from Nelson for To-day. Prize Essay, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.

NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET. Honorable Mention, 1914. By Captain John Hood, U. S. N.

OLD PRINCIPLES AND MODERN APPLICATIONS. Honorable Mention, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.

MILITARY PREPAREDNESS. Honorable Mention, 1914. By Naval Constructor Richard D. Gatewood, U. S. N.

1915

The Rôle of Doctrine in Naval Warfare. Prize Essay, 1915. By Lieut. Commander Dudley W. Knox, U. S. N.

AN AIR FLEET: OUR PRESSING NAVAL WANT. First Honorable Mention, 1915. By Lieut. Commander Thomas Drayton Parker, U. S. N.

TACTICS. Second Honorable Mention, 1915. By Ensign H. H. Frost, U. S. N.

DEFENCE AGAINST SURPRISE TORPEDO ATTACK. Third Honorable Mention, 1915. By Ensign R. T. Merrill, 2d, U. S. N.

1916

The Moral Factor in War. Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. N.

NAVAL PERSONNEL. First Honorable Mention, 1916. By Lieut. Commander J. K. Taussig, U. S. N.

EDUCATION AT THE U. S. NAVAL ACADEMY. Second Honorable Mention, 1916. By Lieutenant Ridgely Hunt, U. S. N.

SOME UNDERLYING PRINCIPLES OF MORALE. Third Honorable Mention, 1916. By Commander Dudley W. Knox, U. S. N.

LARGE *vs.* A GREATER NUMBER OF SMALLER BATTLESHIPS. Lippincott Prize Essay. By Lieut. Commander Thomas Lee Johnson, U. S. N.

1917

Commerce Destroying in War. Prize Essay, 1917. By Commander Lyman A. Cotten, U. S. Navy.

THE PEOPLE'S RÔLE IN WAR. First Honorable Mention, 1917. By Lieutenant H. H. Frost, U. S. Navy.

THE NATION'S GREATEST NEED. Second Honorable Mention, 1917. By Colonel Dion Williams, U. S. Marine Corps.

INDEX TO VOLUME 43

Accuracy of Pointing in Long-Range Naval Gunnery, An Estimate of the Value of. Lieutenant G. L. Schuyler, U. S. Navy. No. **171,** p. 1207.

Addenda to the Article on Correction of Compass Courses. Lieutenant Joaquin Herrera, Chilean Navy. No. **170,** p. 771.

Administration, Principles of. Prepared by Surgeon W. H. Bell, U. S. Navy. No. **172,** p. 1173.

Aeronautics, and War. Wm. E. Beard. No. **178,** p. 2879.

Air Power. Rear Admiral Bradley A. Fiske, U. S. Navy. No. **174,** p. 1701.

Altitude, Azimuth and Hour Angle Diagram. G. W. Littlehales. No. **177,** p. 2541.

American Blind Spot, The. H. C. Washburn. No. **167,** p. 1.

Amusing Fifty Thousand Men. Lieutenant Fitzhugh Green, U. S. Navy. No. **177,** p. 2527.

Annual Meeting, Minutes of. No. **177,** p. 2578.

Arctic Duty; With the Crocker Land Expedition. Lieutenant Fitzhugh Green, U. S. Navy. No. **175,** p. 1941; No. **176,** p. 2193; No. **177,** p. 2455; No. **178,** p. 2799.

Audion, What Happens in an. Lieutenant J. B. Will, U. S. Navy. No. **177,** p. 2505.

Ayesha (Continued). Lieutenant Hellmuth von Mücke, Imperial German Navy. Translated by Lieutenant J. H. Klein, Jr., U. S. Navy. No. **167,** p. 43.

—— (Concluded). Lieutenant Hellmuth von Mücke, Imperial German Navy. Translated by Lieutenant J. H. Klein, Jr., U. S. Navy. No. **168,** p. 255.

Azimuth for Determining the Sumner Line, Finding the. G. W. Littlehales. No. **170,** p. 759.

Battle Trench Pumping Outfit, Description of. Lieutenant W. A. Edwards, U. S. Navy. No. **178,** p. 2921.

Beard, Wm. E. War and Aeronautics. No. **178,** p. 2879.

Belknap, Reginald R., Commander, U. S. Navy. Squadron, The Auxiliary. No. **170,** p. 639.

Bell, W. H., Surgeon, U. S. Navy. Medical Officers of Navy Yards, A Greater Field of Activity for. No. **175,** p. 1977.

Biddle, Edward. Captain Nicholas Biddle (Continental Navy), 1750-1778. No. **175,** p. 1993.

Bieg, V. N., Lieutenant (J. G.), U. S. Navy. Engineering in our Navy Today?, What Can Be Done to Improve. No. **173,** p. 1463.

Blackwood, Norman J., Medical Inspector, U. S. Navy. Medical Officers of Navy Yards, A Greater Field of Activity for. No. **175,** p. 1977.

Breslau, Goeben and. Lieutenant (J. G.) S. F. Bryant, U. S. Navy. No. **178,** p. 2833.
Brooke, B. H., Paymaster, U. S. Navy. Keeping the Accounts of Officers' Messes. No. **174,** p. 1755.
Bryant, S. F., Lieutenant (J. G.), U. S. Navy. *Goeben* and *Breslau.* No. **178,** p. 2833.
Bunkley, J. W., Lieutenant, U. S. Navy. Guns, Droop of. No. **172,** p. 1217.
Burrage, G. H., Captain, U. S. Navy. Notes on Ship Handling. No. **177,** p. 2555.

Carter, A. F., Lieutenant, U. S. Navy. The Upper Yangtse River. No. **168,** p. 325.
Captain Nicholas Biddle (Continental Navy), 1750-1778. Edward Biddle. No. **175,** p. 1993.
Chauvenet, William. Professor W. Woolsey Johnson. No. **176,** p. 2283.
Coburn, F. G., Naval Constructor, U. S. Navy. Navy Yards, Modern Management Applied to. No. **171,** p. 955.
Compulsory Citizenship Training. Dr. Harold S. Hulbert. No. **171,** p. 985.
Conduct of War (Logistics). Major H. C. Davis, U. S. Marine Corps. No. **171,** p. 941.
Cotten, Lyman A., Lieut. Commander, U. S. Navy. Handling Refugees. No. **169,** p. 473.
Court, A. B., Naval Constructor, U. S. Navy. Kapok. No. **167,** p. 125.
Cox, Leonard M., Civil Engineer, U. S. Navy. Enlisted Man's Annapolis, The. No. **170,** p. 655.
Craven, T. T., Commander, U. S. Navy. Tactics and Gunnery. No. **171,** p. 917.
Cruise, The First Naval Training. Lieut. Commander W. B. Tardy, U. S. Navy. No. **169,** p. 505.

Davis, H. C., Major, U. S. Marine Corps. Logistics: Its Influence Upon the Conduct of War and its Bearing Upon the Preparation of War Plans. No. **171,** p. 941.
Dead Reckoner, An Instantaneous. Lieutenant Alfred G. Zimmermann, U. S. Navy. No. **177,** p. 2547.
Dewey, Admiral, An Appreciation. Air Power. Rear Admiral Bradley A. Fiske, U. S. Navy. No. **169,** p. 433; No. **174,** p. 1701.
Discussion: No. **167,** p. 131; No. **170,** p. 772; No. **171,** p. 989; No. **177,** p. 2577.
Doggett, L. A., Professor, U. S. Naval Academy. Radio Stations, Selective. Free Translation. No. **175,** p. 2037.
Durr, Ernest, Lieutenant, U. S. Navy. Recruits, The Training of. No. **167,** p. 99.
Dyer, G. P., Paymaster, U. S. Navy. Storehouse, An Interesting. No. **174,** p. 1713.
Earle, Ralph, Rear Admiral, U. S. Navy. Nitrogen Compounds for Explosives and Fertilizers, Sources of Supply of. No. **176,** p. 2225.

Edwards, W. A., Lieutenant, U. S. Navy. Description of a Battle Trench Pumping Outfit. No. **178,** p. 2921.

Electric Propulsion, Ship Handling with. Lieut. Commander C. S. Kempff, U. S. Navy. No. **174,** p. 1705.

Engineering in Our Navy To-day?, What Can Be Done to Improve. Lieutenant (J. G.) V. N. Bieg, U. S. Navy. No. **173,** p. 1463.

Enlisted Man's Annapolis, The. Civil Engineer Leonard M. Cox, U. S. Navy. No. **170,** p. 655.

Fisher, C. W., Naval Constructor, U. S. Navy. Log of the *Constitution*, The. Navy Yard Spirit, The. No. **168,** p. 227; No. **177,** p. 2495.

Fiske, Bradley A., Rear Admiral, U. S. Navy. Dewey, Admiral, An Appreciation. Air Power. Luce, Stephen B., An Appreciation. Strategy, Tactics, Logistics and Invention. No. **169,** p. 433; No. **174,** p. 1701; No. **175,** p. 1935; No. **178,** p. 2793.

Frost, H. H., Lieutenant (J. G.), U. S. Navy. War, The Peoples Rôle in. Torpedo Operations, Night. No. **172,** p. 1113; No. **174,** p. 1671.

Goeben and *Breslau*. Lieutenant (J. G.) S. F. Bryant, U. S. Navy. No. **178,** p. 2833.

Goodrich, Caspar F., Rear Admiral, U. S. Navy. Navy and the West Indian Pirates, Our. A Documentary History. No. **167,** p. 83; No. **168,** p. 313; No. **169,** p. 483; No. **170,** p. 683; No. **171,** p. 973; No. **172,** p. 1197; No. **173,** p. 1449; No. **174,** p. 1727; No. **175,** p. 2023.

Green, Fitzhugh, Lieutenant, U. S. Navy. Arctic Duty; With the Crocker Land Expedition. No. **175,** p. 1941; No. **176,** p. 2193; No. **177,** p. 2455; No. **178,** p. 2799.

Amusing Fifty Thousand Men. No. **177,** p. 2527.

Greenlee, H. R., Lieutenant, U. S. Navy. Navigator, A Few Hints to the New. No. **170,** p. 719.

Guam, History of the Capture of, by the United States Man-of-War *Charleston* and its Transport. Frank Portusach. No. **170,** p. 707.

Guns, Droop of. Lieutenant J. W. Bunkley, U. S. Navy. No. **172,** p. 1217.

Hall, David A., U. S. Coast Guard, ret. Wreck of the U. S. S. *De Soto*. Launching of the U. S. S. *Monogahela*, The. No. **172,** pp. 1151, 1161.

Harts, Wm. W., Colonel, U. S. Army. War College, A Combined Army and Navy. No. **168,** p. 287.

Herrera, Joaquin, Lieutenant, Chilean Navy. Addenda to the Article on Correction of Compass Courses. No. **170,** p. 771.

Hovgaard, William, Professor, Late Commander, Royal Danish Navy. Strategical Sketches, Some. No. **168,** p. 233.

Hulbert, Harold S., Doctor. Compulsory Citizenship Training. No. **171,** p. 985.

Huse, H. P., Captain, U. S. Navy. Logistics: Its Influence Upon the Conduct of War and its Bearing Upon the Formulation of War Plans. No. **168,** p. 245.

Index. Information: No. **168,** p. 369; No. **169,** p. 562; No. **170,** p. 778; No. **171,** p. 994; No. **172,** p. 1236; No. **173,** p. 1478; No. **174,** p. 1770; No. **175,** p. 2044; No. **176,** p. 2293; No. **177,** p. 2592; No. **178,** p. 2931.

International Notes: Diplomatic Notes. No. **167,** p. 204; No. **168,** p. 412; No. **169,** p. 615; No. **170,** p. 876; No. **171,** p. 1086; No. **172,** p. 1350; No. **173,** p. 1640; No. **174,** p. 1913; No. **175,** p. 2165; No. **176,** p. 2430; No. **177,** p. 2762; No. **178,** p. 3071.

——— Naval War Notes. No. **167,** p. 189; No. **168,** p. 407; No. **169,** p. 609; No. **170,** p. 859; No. **171,** p. 1073; No. **172,** p. 1313; No. **173,** p. 1593; No. **174,** p. 1851; No. **175,** p. 2115; No. **176,** p. 2383; No. **177,** p. 2699; No. **178,** p. 3025.

Jackson, John P., Lieut. Commander, U. S. Navy. Universal Service, A Plea for. No. **168,** p. 295.

Jacobs, W. F., Lieutenant, U. S. Navy. Strength in Action. No. **175,** p. 2005.

Johnson, W. Woolsey, Professor. Chauvenet, William. No. **176,** p. 2283.

Kapok. Naval Constructor A. B. Court, U. S. Navy. No. **167,** p. 125.

Kempff, C. S., Lieut. Commander, U. S. Navy. Ship Handling with Electric Propulsion. No. **174,** p. 1705.

Kinkaid, Thomas W., Captain, U. S. Navy. Naval Corps. No. **169,** p. 497.

Klein, J. H., Lieutenant, U. S. Navy. Translation *Ayesha* (Continued). Translation *Ayesha* (Concluded). No. **167,** p. 43; No. **168,** p. 255.

Launching of the U. S. S. *Monongahela*, The. Captain David A. Hall, U. S. Coast Guard, ret. No. **172,** p. 1161.

Littlehales, G. W. Altitude, Azimuth and Hour Angle Diagram. No. **177,** p. 2541.

Log of the *Constitution*, The. The Capture of the *Cyane* and the *Levant*. Naval Constructor C. W. Fisher, U. S. Navy. No. **168,** p. 227.

Logistics: Its Influence Upon the Conduct of War and its Bearing Upon the Formulation of War Plans. Captain H. P. Huse, U. S. Navy. No. **168,** p. 245.

——— Its Influence Upon the Conduct of War and its Bearing Upon the Preparation of War Plans. Major H. C. Davis, U. S. Marine Corps. No. **171,** p. 941.

List of Prize Essays. No. **167,** p. 218.

List of Articles Related to War College Work. No. **167,** p. 223

Littlehales, G. W. Azimuth for Determining the Sumner Line, Finding the. No. **170,** p. 759.

Luce, Stephen B. An Appreciation. Rear Admiral Bradley A. Fiske, U. S. Navy. No. **175,** p. 1935.

Maclay, Edgar Stanton. *Randolph-Yarmouth* Naval Battle, New Details of. No. **173,** p. 1445.

Mayo, C. B., Lieut. Commander, U. S. Navy. Stonewall Jackson from a Naval Viewpoint. No. **178,** p. 2893.

Medical Officers of Navy Yards, A Greater Field of Activity for. Medical Inspector Norman J. Blackwood and Surgeon W. H. Bell, U. S. Navy. No. **175,** p. 1977.

Messes Aboard Ship, Providing Food for Officers'. Paymaster Geo. R. Venable, U. S. Navy, Supply Officer, U. S. S. *New York.* No. **174,** p. 1745.

Messes, Keeping the Accounts of Officers'. Paymaster B. H. Brooke, U. S. Navy. No. **174,** p. 1755.

Messes, Officers'. Chief Boatswain Edwin Murphy, U. S. Navy. No. **174,** p. 1739.

Meyers, G. J., Commander, U. S. Navy. Course in Marine Engineering for Reserve Officers. No. **177,** p. 2563.

Military Character. Captain Wm. S. Sims, U. S. Navy. No. **169,** p. 437.

Moon in Navigation, The. Commander H. G. Sparrow, U. S Navy. No. **177,** p. 2553.

Morgan, James Morris. (Aide de Camp of Commodore Hollins, Confederate States Navy.) The Pioneer *Iron Clad.* No. **176,** p. 2275.

Moses, S. E., Commander, U. S. Navy. Orient in 1916: The, Its Interest to the United States. No. **167,** p. 73.

Munroe, Charles E. Translation of. Projectiles Containing Explosives by Commandant A. R. No. **170,** p. 665.

Murphy, Edwin, Chief Boatswain, U. S. Navy. Officers' Messes. No. **174,** p. 1739.

Nation's Greatest Need, The. Colonel Dion Williams, U. S. Marine Corps. No. **171,** p. 891.

Naval Communication Service, Services Rendered Mariners by the. Lieutenant (J. G.) B. V. McCandlish, U. S. Navy. No. **170,** p. 765.

Naval Corps. Captain Thomas W. Kinkaid, U. S. Navy. No. **169,** p. 497.

Naval Graduates' Association. No. **171,** p. 1100; No. **173,** p. 1655.

Naval Gunnery, An Estimate of the Value of Accuracy of Pointing in Long-Range. Lieutenant G. L. Schuyler, U. S. Navy. No. **171,** p. 1207.

Naval Training Cruise, The First. Lieut. Commander W. B. Tardy. U. S. Navy. No. **169,** p. 505.

Navigation, Some Practical Hints in. Lieut. Commander F. L. Oliver, U. S. Navy. Principles, Back to First. Telescopic Azimuth Circle, The. No. **170,** pp. 737, 745, 747.

Navigator, A Few Hints to the New. Lieutenant H. R. Greenlee, U. S. Navy. No. **170,** p. 719.

Navy Yards, Modern Management Applied to. Naval Constructor F. G. Coburn, U. S. Navy. No. **171,** p. 955.

Navy Yards for War, Prepare the. Naval Constructor Henry Williams, U. S. Navy. No. **169,** p. 463.

Navy Yard Spirit. Naval Constructor C. W. Fisher, U. S. Navy. No. **177,** p. 2495.

Navy and the West Indian Pirates, Our (Continued). A Documentary History. Rear Admiral Caspar F. Goodrich, U. S. Navy. No. **167,** p. 83; No. **168,** p. 313; No. **169,** p. 483; No. **170,** p. 683; No. **171,** p. 973; No. **172,** p. 1197; No. **173,** p. 1449; No. **174,** p. 1727; No. **175,** p. 2023.

Nitrogen Compounds for Explosives and Fertilizers, Sources of Supply of. Rear Admiral Ralph Earle, U. S. Navy. No. **176,** p. 2225.
Notice. Extract from Constitution. No. **167,** p. 215.

Officer in the United States Navy To-day, What it Means to be. H. C. Washburn, Instructor, U. S. Naval Academy. No. **178,** p. 2897.
Officers' Messes. Chief Boatswain Edwin Murphy, U. S. Navy. No. **174,** p. 1739.
Officers' Messes Aboard Ship, Providing Food for. Paymaster Geo. R. Venable, U. S. Navy; Supply Officer, U. S. S. *New York*. No. **174,** p. 1745.
Officers' Messes, Keeping the Accounts of. Paymaster B. H. Brooke, U. S. Navy. No. **174,** p. 1755.
Oliver, F. L., Lieut. Commander, U. S. Navy. Navigation, Some Practical Hints in. Principles, Back to First. Telescopic Azimuth Circle, The. No. **170,** pp. 737, 745, 747.
Organization, The Situation and. Major G. C. Thorpe, U. S. Marine Corps. No. **176,** p. 2247.
Orient in 1916; The, Its Interest to the United States. Commander S. E. Moses, U. S. Navy. No. **167,** p. 73.

Pay Corps of the Navy, The. Pay Inspector David Potter, U. S. Navy. No. **178,** p. 2849.
Portusach, Frank. Guam, History of the Capture of, by the United States Man-of-War *Charleston* and its Transport. No. **170,** p. 707.
Position Lines and Current. Lieut. Commander H. G. Sparrow, U. S. Navy. No. **170,** p. 751.
Potter, David, Pay Inspector, U. S. Navy. The Pay Corps of the Navy. No. **178,** p. 2849.
Prize Essay Topics. No. **167,** p. 217.
Professional Notes. No. **167,** p. 141; No. **168,** p. 377; No. **169,** p. 563; No. **170,** p. 779; No. **171,** p. 995; No. **172,** p. 1237; No. **173,** p. 1479; No. **174,** p. 1771; No. **175,** p. 2045; No. **176,** p. 2295; No. **177,** p. 2588; No. **178,** p. 2933.
Projectiles Containing Explosives. Commandant A. R. Translated by Charles E. Munroe. No. **170,** p. 665.

Radio Stations, Selective. Free Translation by Professor L. A. Doggett, U. S. Naval Academy. No. **175,** p. 2037.
Randolph-Yarmouth Naval Battle, New Details of the. Edgar Stanton Maclay. No. **173,** p. 1445.
Recruits, The Training of. Lieutenant Ernest Durr, U. S. Navy. No. **167,** p. 99.
Refugees, Handling. Lieut. Commander Lyman A. Cotten, U. S. Navy. No. **169,** p. 473.
Report of Audit, Annual. No. **168,** p. 371.
Reserve Officers, Course in Marine Engineering for. Commander G. J. Meyers, U. S. Navy. No. **177,** p. 2563.

Review of Books. No. **167,** p. 213; No. **168,** p. 425; No. **169,** p. 625; No. **170,** p. 882; No. **172,** p. 1358; No. **173,** p. 1649; No. **174,** p. 1923; No. **175,** p. 2179; No. **176,** p. 2439; No. **177,** p. 2777; No. **178,** p. 3085.

Salvo Pattern, The Relation of Mean Dispersion to Total Size of. Lieutenant G. L. Schuyler, U. S. Navy. No. **172,** p. 1213.

Schuyler, G. L., Lieutenant, U. S. Navy. Naval Gunnery, An Estimate of the Value of Accuracy of Pointing in Long-Range. Salvo Pattern, The Relation of Mean Dispersion to Total Size of. No. **172,** pp. 1207, 1213.

Sebastian, British Motor Vessel, Loss of. Ensign Z. W. Wicks, U. S. Navy. No. **178,** p. 2917.

Secretary's Notes. No. **167,** p. 136; No. **168,** p. 365; No. **169,** p. 559; No. **170,** p. 775; No. **171,** p. 991; No. **172,** p. 1233; No. **173,** p. 1475; No. **174,** p. 1767; No. **175,** p. 2041; No. **176,** p. 2289; No. **177,** p. 2588.

Ship Handling with Electric Propulsion. Lieut. Commander C. S. Kempff, U. S. Navy. No. **174,** p. 1705.

Ship Handling, Notes on. Captain G. H. Burrage, U. S. Navy. No. **177,** p. 2555.

Sims, Wm. S., Captain, U. S. Navy. Military Character. No. **169,** p. 437.

Snow, Elliot, Naval Constructor, U. S. Navy. Voice Pipes for Fire Control Communication, The Value of. No. **173,** p. 1417.

Sparrow, H. G., Lieut. Commander, U. S. Navy. Position Lines and Current. The Moon in Navigation. No. **170,** p. 751; No. **177,** p. 2552.

Special Notice—Naval Institute Prize Essay, 1918. No. **167,** p. 216.

Squadron, The Auxiliary. Commander Reginald R. Belknap, U. S. Navy. No. **170,** p. 639.

Stirling, Yates, Commander, U. S. Navy. Submarine, The. No. **173,** p. 1371.

Stonewall Jackson from a Naval Viewpoint. Lieut. Commander G. B. Mayo, U. S. Navy. No. **178,** p. 2893.

Storehouse, An Interesting. Paymaster G. P. Dyer, U. S. Navy. No. **174,** p. 1713.

Strategical Sketches, Some. Professor William Hovgaard, Late Commander Royal Danish Navy. No. **168,** p. 233.

Strategy, Tactics, Logistics and Invention. Rear Admiral Bradley A. Fiske, U. S. Navy. No. **178,** p. 2793.

Strength in Action. Lieutenant W. F. Jacobs, U. S. Navy. No. **175,** p. 2005.

Submarine, The. Commander Yates Stirling, U. S. Navy. No. **173,** p. 1371.

Tactics and Gunnery. Commander T. T. Craven, U. S. Navy. No. **171,** p. 917.

Tardy, W. B., Lieut. Commander, U. S. Navy. The First Naval Training Cruise. No. **169,** p. 505.

The Pioneer *Iron Clad.* James Morris Morgan, Aide de Camp of Commodore Hollins, Confederate States Navy. No. **176,** p. 2275.

Thorpe, G. C., Major, U. S. Marine Corps. Organization, The Situation and. No. **176,** p. 2247.

Torpedo Operations, Night. Lieutenant (J. G.) H. H. Frost, U. S. Navy. No. **174,** p. 1671.

United States Power Squadrons, The. A Letter from Mr. Roger Upton. No. **170,** p. 699.
Universal Service, A Plea for. Lieut. Commander John P. Jackson, U. S. Navy. No. **168,** p. 295.
Upton, Roger (A Letter from). United States Power Squadrons, The. No. **170,** p. 699.

Venable, Geo. R., Paymaster, U. S. Navy. Providing Food for Officers' Messes Aboard Ship. No. **174,** p. 1745.
Voice Pipes for Fire Control Communication, The Value of. Naval Constructor Elliot Snow, U. S. Navy. No **173,** p. 1417.
Von Mücke, Hellmuth, Lieutenant, Imperial German Navy. *Ayesha* (Continued). *Ayesha* (Concluded). Translated by Lieutenant J. H. Klein, U. S. Navy. No. **167,** p. 43; No. **168,** p. 255.

War and Aeronautics. Wm. E. Beard. No. **178,** p. 2879.
War College, A Combined Army and Navy. Colonel Wm. W. Harts, U. S. Army. No. **168,** p. 287.
War, The People's Rôle in. Lieutenant H. H. Frost, U. S. Navy. No. **172,** p. 1113.
War with Spain, The. A Study of Past Performance. H. C. Washburn. No. **173,** p. 1391.
War Plans, The Preparation of (Logistics). Major H. C. Davis, U. S. Marine Corps. No. **171,** p. 941.
Washburn, H. C. The American Blind Spot. War with Spain, The. What it Means to be an Officer in the United States Navy To-day. No. **167,** p. 1; No. **173,** p. 1391; No. **178,** p. 2897.
Wicks, Z. W., Ensign, U. S. Navy. The Loss of the British Motor Vessel *Sebastian.* No. **178,** p. 2917.
Will, J. B., Lieutenant, U. S. Navy. What Happens in an Audion. No. **177,** p. 2504.
Williams, Dion, Colonel, U. S. Marine Corps. Nation's Greatest Need, The. No. **171,** p. 891.
Williams, Henry, Naval Constructor, U. S. Navy. Navy Yards for War, Prepare the. No. **169,** p. 463.
Wreck of the U. S. S. *De Soto,* The. Captain David A. Hall, U. S. Coast Guard, ret. No. **172,** p. 1151.

Yangtse River, The Upper. Lieutenant A. F. Carter, U. S. Navy. No. **168,** p. 325.

Zimmermann, Alfred G., Lieutenant, U. S. Navy. An Instantaneous Dead Reckoner. No. **177,** p. 2547.

UNITED STATES NAVAL INSTITUTE PROCEEDINGS

1873-1917

PUBLISHED MONTHLY

Annual dues (including subscription) for regular and associate members $2.00, payable upon joining the Institute and upon the first day of each succeeding January. No initiation fee is required.

Subscription to the Proceedings for non-members is $3.00 per annum; enlisted men, U. S. Navy, $2.00 per annum.

Single copies, by purchase, 30 cents; all issues preceding January, 1917, 50 cents.

Postage, at the rate of 50 cents per annum, must be paid on foreign subscriptions.

Subscriptions must be paid for in advance.

Proceedings bound in cloth, $3.50 additional per year, 50 cents of this being for postage.

The Proceedings can be secured through any news agency or direct from the Institute.

Remittances should be made payable to the

SECRETARY AND TREASURER
U. S. NAVAL INSTITUTE
ANNAPOLIS, MARYLAND

PUBLICATIONS
U. S. NAVAL INSTITUTE

U. S. Naval Institute Proceedings.

Published monthly. Annual subscription to the PROCEEDINGS for non-members, ***$3.00,*** foreign postage, ***50*** cents; enlisted men, U. S. Navy, ***$2.00.*** Single copies by purchase, ***30*** cents; all issues preceding January, 1917, ***50*** cents.

Members or subscribers desiring to receive their copies of the PROCEEDINGS bound in cloth may do so by the payment of ***$3.50*** per year in addition to their dues or subscription, of which ***50*** cents is for postage.

Members or subscribers desiring to have their copies of the PROCEEDINGS bound in half Morocco may have the work done through the Institute at a price of ***$2.50*** per cover, postage or carriage additional. The PROCEEDINGS of each year, stripped and bound, make two conveniently sized volumes.

Publication of books marked with an asterisk (*) has been discontinued. The Institute, however, holds copies which may be obtained until the present edition becomes exhausted.

Catalogue of books published by the Institute containing detailed description and list of contents may be obtained on application to the Secretary and Treasurer, U. S. Naval Institute.

Orders for *enlisted men* to the amount of $10.00 or for ten or more of any publication will be furnished at a discount of 10 per cent, carriage prepaid. Additional discounts allowed for special orders in quantities.

NAVIGATION

Navigation and Compass Deviations (Revised edition, with all problems and solutions brought to accord with the new form of the Nautical Almanac, will be published and ready for issue about November 15).

By Commander W. C. P. Muir, U. S. Navy, formerly Head of Department of Navigation, U. S. Naval Academy. A practical treatise on navigation and nautical astronomy, including the theory of compass deviation, prepared for use as a text-book at the U. S. Naval Academy. Though written primarily for use of midshipmen, the various subjects have been so presented that any zealous student possessing but a slight knowledge of trigonometry may be able to master the methods given.

12mo, 765 + xvi pages, illustrated by diagrams and many text figures. Price $4.20. Postage paid.

Elements of Hydrographic Surveying (1911).

By Lieut. Commander George Wood Logan, U. S. N. All branches of the work connected with a marine hydrographic survey as ordinarily carried out have been completely described, and the book is, therefore, available for purposes of reference for naval officers and others who may be engaged in such work.

12mo, 176 pages, full cloth. Price $1.50. Postage paid.

A Practical Manual of the Compass.

The revision consists chiefly of the addition of a chapter on service instruments and one on the gyroscopic compass. A valuable book for navigators and officers preparing for promotion.

Originally prepared by Lieut. Commander Harris Laning, U. S. N., for the use of midshipmen to give them a sufficient knowledge of compass work to enable them to efficiently care for and use compasses on board ship. The complex mathematical theory of the deviation of the compass and the derivation of formulæ have been entirely omitted, but a sufficient explanation of causes and effects is given to enable the student to understand any ordinary problem that may arise. The book contains all the most recent data on the subject of compensation of the compass as well as copies of all the forms used in compass work with an explanation of how to use them.

7 x 10½ in., 146 pages. Bound in flexible cloth. Price ***$1.75.*** *Postage paid.*

Copies of first edition of this book on sale at ***75*** cents, postage paid.

MARINE ENGINEERING

Naval Reciprocating Engines and Auxiliary Machinery ("Naval Engines and Machinery").

By Commander John K. Barton, U. S. Navy, Former Head of Department of Marine Engineering and Naval Construction, U. S. Naval Academy. Revised by Comdr. H. O. Stickney, U. S. Navy, recently Head of Department of M. E. and N. C., U. S. Naval Academy.

A text-book for the instruction of midshipmen and for officers preparing for examination, fully illustrated with upwards of 260 text figures, and 48 plates 8 x 10 inches bound separately.

8vo, 619 pages, full cloth. Price ***$4.90.*** *Postage paid.*

Marine and Naval Boilers.

By Lieut. Commander Frank Lyon, U. S. N., and Lieut. Commander A. W. Hinds, U. S. N. Revised by Lieutenants W. P. Beehler and John S. Barleon, U. S. Navy, of the Department of Marine Engineering and Naval Construction, U. S. Naval Academy, under the supervision of the Head of the Department.

This book was prepared in order to provide an up-to-date text-book for the midshipmen at the U. S. Naval Academy. Plates and descriptions include the most modern boiler installations on naval vessels. The great gain in fuel economy made possible by the combination of gas analysis with intelligent firing is fully described. The causes of boiler corrosion with the practical methods of its prevention are included. A study of the book should furnish all the information necessary for the efficient handling of a boiler plant. This book has been revised to May, 1915.

The book is profusely illustrated by text figures and 16 folding plates.

8vo, 404 pages. Bound in full cloth. Price ***$3.25.*** *Postage paid.*

Steam Turbines.

A treatise covering U. S. Naval Practice. By Lieut. Comdr. G. J. Meyers, U. S. Navy, of the Department of Marine Engineering and Naval Construction, U. S. Naval Academy.

This book covers turbine installations in the U. S. Navy with chapters on the elementary principles of design and construction. Especially adapted for use of midshipmen and officers of the navy

and for an elementary text-book in colleges and universities. It was written to fill the want of a text-book more for the student and operating engineer than for the designer. Illustrated with 165 text figures, 9 plates 11 x 40 inches showing half cross sections of the latest Curtis and Parsons turbines.

Bound in full cloth. Price $4.50. (Subject to change.)

Experimental Engineering (1911).

By Commander U. T. Holmes, U. S. Navy.

In attempting to revise the volume of "Notes on Experimental Engineering," compiled by the author in 1907, so much new matter was at hand, and so many changes were found necessary, that it was deemed advisable to re-write the whole book.

The new book should be of great assistance to those officers who wish to embrace the many opportunities to record valuable engineering data and make proper deductions therefrom.

8vo, 311 pages, 152 illustrations, cloth. Price ***$2.15.*** *Postage paid.*

Mechanical Processes (1917).

By Lieut. G. W. Danforth, U. S. Navy, Former Instructor in the Department of Marine Engineering and Naval Construction, U. S. Naval Academy.

Giving an account of the materials used in engineering construction and of the essential features in the methods of producing them, also describing shop processes and equipment for the shaping of metals into forms for engineering and general uses.

Effort has been made to present the subject matter in brief and elementary form, with sufficient detail to outline methods and principles clearly. It is intended to show completely, though briefly, the steps of metal manufacture from the ore to the finished product, so that the student may be enabled to classify all branches of metal manufacture, and may pursue intelligently such study as will give fuller information than is possible to include herein.

8vo, 405 pages, 270 illustrations, full cloth. Price ***$3.75.*** *Postage paid.*

Handy Book for Enlisted Men of the Engineer Department.

By Midshipman B. R. Ware, Jr., U. S. Navy.

A brief, practical aid for the men composing the engineer department of a sea-going ship.

This book is under revision by the U. S. Naval Institute and will be published about January 1, 1918.

*Engineering Mechanics (1911).

A revision of "Notes on Machine Design," prepared by Officers of the Department of Marine Engineering and Naval Construction, U. S. Naval Academy, combined with the mathematics and general principles necessary for the solution of the problems, by C. N. Offley, U. S. N.

8vo, 326 pages, 2 plates. Bound in full cloth. Price ***$3.25.*** *Postage paid.*

*Notes on Steam Engineering (1901).

Arranged for the use of Officers of the Old Line of the Navy.

*8vo, 154 pages. Bound in paper. Price **60** cents. Postage paid.*

NAVAL CONSTRUCTION

Naval Construction.

By Naval Constructor R. H. M. Robinson, U. S. N. A modern text-book used in the course of naval architecture by midshipmen of the first class, prepared with a view to the special requirements of the U. S. Naval Academy and based upon the practice of the U. S. Navy.

*8vo, 285 + VII pages, illustrated by 162 figures and 5 plates. Price **$4.00**. Postage paid.*

*The Oscillations of Ships (1902).

Compiled and edited by the Department of Marine Engineering and Naval Construction, United States Naval Academy.

*Bound in flexible cloth. Price **55** cents. Postage paid.*

OFFICIAL DRILL BOOKS FOR THE U. S. NAVY

AUTHORIZED BY THE NAVY DEPARTMENT

The Landing Force and Small-Arm Instructions (Revised, 1916).

The edition of this book is exhausted and a new edition will not be published as The Landing Force Manual, U. S. Navy, 1917, is being compiled by a board of officers. The complete Landing Force Manual will be published in December and will be ready for distribution in January, 1918.

The Deck and Boat Book of the U. S. Navy, 1914 (Corrected to January 1, 1917, and reprinted April 1, 1917).

The Deck and Boat Book is issued for use on the ship's bridge. No boat expedition should ever be without one for each boat and the means of making signals. As far as practicable all boats away from their ships on any duty where signal communication may be desirable should have a copy. Coxswains as well as signal men should be thoroughly familiar with its contents.

*184 pages and 8 flag plates in four colors. Price **45** cents, cloth.*

Ship and Gun Drills, U. S. Navy, 1914 (reprinted 1916).

This drill book is designed to cover, so far as practicable, all drills and exercises which are carried out exclusively on board ship.

*Illustrated. Cloth binding, price **45** cents. Postage paid.*

SEAMANSHIP

The Watch Officer's Manual (1917).

By the late Ensign C. E. Hovey, U. S. Navy. This manual has been revised to bring it in complete accord with present regulations and

methods of watch standing and ship handling. New material has been added to round out the work and make it an indispensable assistant to the present day watch officer.

In flexible cloth, about 90 pages text and 20 pages of colored plates. Price ***$1.10****, postpaid.*

Bluejacket's Manual, U. S. Navy (Fifth edition, revised, 1917).

"The Bluejacket's Manual" originally prepared in 1902 by Lieutenant Ridley McLean, U. S. Navy, revised in 1914 to correspond with the provisions of General Order No. 63 of December 16, 1913, and now revised to date by Lieutenant N. R. Van der Veer, U. S. Navy, is issued to the service for the guidance and the instruction of petty officers and enlisted men. In accordance with General Order No. 63, the Manual is divided into the following parts:

Part I.—The Subjects which Every Man on Board Ship Should Know.

Part II.—The Subjects which Seamen, Second Class, Should Know.

Part III.—The Subjects which the Higher Ratings of the Seaman Branch Should Know.

Part IV.—The Subjects which Chief Petty Officers Should Know.

Part V.—The Subjects which Men of Special Ratings Should Know.

Stiff buckram. Price ***75*** *cents, prepaid.*

The Recruit's Handy Book, U. S. Navy (1917).

By Captain W. F. Fullam, U. S. Navy. A most useful primer for the Naval Recruit. It shows him what the navy offers him in the way of a career, and it contains instruction in the rudiments of a seaman's profession.

Flexible buckram cover. Price ***20*** *cents, postpaid.*

*A Battleship's Order Book.

A Battleship's Order Book (1908), by Lieut. Commander A. B. Hoff, U. S. N., follows the generally accepted ideas and regulations of the service and the Atlantic Fleet in regard to liberty, uniform, punishments, routine, etc.

12mo, 96 pages text, 96 pages blank, full cloth. Price ***85*** *cents. Postage paid.*

* Hints for Junior Officers Doing Line Duty.

Lieutenant B. B. Wygant, U. S. Navy.

26 pages, paper cover. Price ***15*** *cents. Postage paid.*

ELECTRICAL ENGINEERING

Manual of Wireless Telegraphy for the Use of Naval Electricians (Undergoing revision; new edition will be ready in January, 1918).

By Commander S. S. Robison, U. S. Navy, with revisions and additions by L. W. Austin, Ph. D., Navy Department, Bureau of Equipment, and Wm. S. Cowles, Chief of Bureau.

8vo, 220 pages text, illustrated by 120 figures. Bound in full white canvas. Price ***$1.50****. Postage paid.*

Naval Electrician's Text-Book. 2 vols. (1917.)

By Captain W. H. G. Bullard, U. S. Navy, completely revised and largely rewritten by officers and instructors of the Department of Electrical Engineering & Physics, June, 1916–July, 1917.

This work was called into existence by the demand of the naval service for a text book which would teach the theory of electrical engineering, stressing such portions as apply particularly to naval practice; the principles governing the operation and use of electrical equipment; and the special knowledge required for the inspection, care and operation of naval electrical apparatus.

Volume I contains the theoretical study of electricity and the principles of electrical engineering. It covers the practice and principles involved in the construction of all direct current and alternating current machines, instruments, devices and apparatus. Special attention has been given to alternating current theory and to the engineering principles which are involved in the subject of electric drive for naval vessels, and the use of alternating current equipment in the navy afloat and ashore. The section devoted to the subject of radio telegraphy and telephony is unusually complete in its exposition of theory and principles.

Volume II deals with the practical part of naval electrical engineering and contains matter descriptive of generators, motors, distribution systems, auxiliary machinery and miscellaneous apparatus, with principles of operation. Notable features of this volume are the discussion of electrical ship propulsion and electrical equipment of submarines, excellent outlines of interior communication and fire control systems. A very successful effort has been made to eliminate from this volume all unnecessary descriptive and specification matter, and to retain only such material as has value along instructive and operative lines.

Volume I contains 730 pages, 543 illustrations and an appendix containing standardization rules of the A. I. E. E.

Volume II contains 520 pages and 299 illustrations, including seven large folding diagrams.

Price, bound in full cloth, ***$3.75*** *per volume (2 volumes,* ***$7.50****), postpaid.*

*Electrical Installations of the United States Navy (1907).

By Commander Burns T. Walling, U. S. Navy, and Julius Martin, E. E., Master Electrician of the Equipment Department, Navy Yard, New York.

A Manual of material, including its use, operation, inspection, care, and management, and method of installion on board ship.

8vo, 648 pages, 300 illustrations, full cloth. Price ***$3.50****. Postage paid.*

ORDNANCE

Naval Ordnance: Text-Book of Ordnance and Gunnery. Revised Edition, 1915. Corrected to April, 1917.

By Lieut. Commander Roland I. Curtin and Lieut. Commander Thomas L. Johnson, U. S. Navy.

This book has been adopted as a text-book at the U. S. Naval Academy.

8vo, 383 pages, 57 illustrations, bound in full cloth. Price ***$4.85****, postage paid.*

The Groundwork of Practical Naval Gunnery, or, Exterior Ballistics.

By Philip R. Alger, Professor U. S. Navy. Revised and extended to include the formulæ and methods of Colonel James M. Ingalls, U. S. Army, by the officers on duty in the Department of Ordnance and Gunnery, U. S. Naval Academy.

6½ x 10¼ in., 360 pages, bound in full cloth. Price **$4.50,** *postpaid.*

Range and Ballistic Tables.

To be used with Exterior Ballistics.

Reprinted for the use of the Midshipmen of the Naval Academy in connection with their course of study in exterior ballistics. They permit problems to be given covering nearly all the guns in most frequent use in the navy at the present time.

12 x 9½ in. (oblong quarto), 95 pages. Bound in full cloth. Four marginal thumb indexes. Price **$2.75,** *postpaid.*

INTERNATIONAL AND CONSTITUTIONAL LAW

A Manual of International Law for the use of Naval Officers (1917).

By Rear Admiral C. H. Stockton, U. S. N., Retired. Sometime Lecturer upon International Law at the Naval War College, author of "The Laws and Usages of War at Sea: a Naval War Code."

The aim of this work is to present sound and authoritative information based on the historical and accepted policy of our government, as well as the best and most recent European views upon matters of international law.

A supplementary chapter on the new situations which have arisen during the present war and a complete index have been incorporated in this work.

12mo, 340 pages, cloth. Price **$1.50.** *Postage paid.*

Constitutional Law.

By H. J. Fenton, M. A., L. B., Instructor, U. S. Naval Academy. An introductory treatise designed for use in the United States Naval Academy and in other schools where the principles of the Constitution of the United States are studied.

A study of the text of the Constitution and the principles of law pertaining to it. An abstract of the leading and most interesting Supreme Court cases bearing on the Constitution is printed in Chapter IX and serves to fix the principles of the Constitution clearly in mind.

12mo, 267 pages, cloth. Price **$1.35.** *Postage paid.*

*Notes on International Law (1904).

By Lieut. C. P. Eaton, U. S. N., member of the New Jersey Bar. This book consists of questions which have been asked on examination of Line Officers of the U. S. Navy, with their answers; others arranged so as to bring out the subjects more fully, with answers, together with Situations and Solutions propounded and solved at the U. S. Naval War College. The form of "Questions and Answers" is a very convenient one in many ways.

8vo. 139 pages, bound in flexible cloth. Price **$1.10.** *Postage paid.*

STRATEGY AND TACTICS

School of the Ship, etc. (1910).

By Rear Admiral A. W. Grant, U. S. N. (This book is being revised and will be ready about March, 1918.)

The Fundamentals of Naval Tactics.

By Lieutenant Romeo Bernotti, Royal Italian Navy. Translated by Lieutenant H. P. McIntosh, U. S. Navy.

12mo, 184 pages, cloth. Price **$1.10.** *Postage paid.*

Naval War College Pamphlets.

The Estimate of the Situation.
The Formulation of Orders.

Paper covers. Price **15** *cents each.*

*Elements of Naval Warfare.

By Commander Carlo B. Brittain, U. S. Navy, Former Head of Department of Seamanship, United States Naval Academy.

12mo, 124 pages, bound in cloth. Price **$1.10.** *Postage paid.*

LANGUAGES

A French Nautical Phrase Book and Reader.

By the Department of Modern Languages, U. S. Naval Academy.

Part I of this work is based on "Nautical Phraseology" (1911) embracing such changes in text and arrangement as experience in its use, and comment from the service at large, have indicated. Part II, the "Nautical Reader," is the outcome of an effort to teach the midshipmen ordinary naval words and expressions by the usual means of instruction.

12mo, 97 pages, cloth binding. Price **75** *cents, postpaid.*

A Spanish Nautical Phrase Book and Reader.

By the Department of Modern Languages, U. S. Naval Academy.

Part I of this work is based on "Nautical Phraseology" (1911) embracing such changes in text and arrangement as experience in its use, and comment from the service at large, have indicated. Part II, the "Nautical Reader," is the outcome of an effort to teach the midshipmen ordinary naval words and expressions by the usual means of instruction.

12mo, 95 pages, cloth binding. Price ***75 cents, postpaid.***

MATHEMATICS

Trigonometry and Stereographic Projections.

By Professor S. J. Brown, U. S. N. Prepared for the use of midshipmen and adopted as a text-book.

8mo, 132 pages, cloth binding. Price ***$1.35.*** *Postage paid.*

Mechanics.

By Professor H. E. Smith, U. S. N. Prepared for the use of midshipmen and adopted as the text-book at the Naval Academy.

12mo, xi + 269 pages, cloth binding. Price ***$3.60.*** *Postage paid.*

Practical Algebra.

By Professor S. J. Brown, U. S. N., and Instructor Paul Capron, U. S. N. A. Used as a text-book by the midshipmen at the Naval Academy.

12mo, ix + 191 pages, cloth binding. Price ***$1.45.*** *Postage paid.*

Calculus.

By Professor S. J. Brown, U. S. N., and Instructor Paul Capron, U. S. N. A. Used as a text-book at the Naval Academy.

12mo, ix + 288 pages, cloth binding. Price ***$3.35.*** *Postage paid.*

MISCELLANEOUS

Physiology, First Aid and Naval Hygiene.

By Doctor R. G. Heiner, U. S. Navy. A text-book for the Department of Naval Hygiene and Physiology at the U. S. Naval Academy, Annapolis, Md.

This book should be made available for the use of all officers and enlisted men. It is highly recommended to Divisional Officers to be used in the general instruction of their men.

12mo, 139 pages. Bound in full cloth, price ***$1.00.*** *Postage paid.*

U. S. Navy Cook Book (1908).

Prepared by the direction of the Bureau of Navigation at the School for Cooks and Bakers, U. S. Navy Training Station, Newport, Rhode Island. All the methods and recipes given have been tried with success at the Cooking School.

62 pages, flexible library duck. Price ***25 cents.*** *Postage paid.*

Illustrated Case Inscriptions from the Official Catalogue of the Trophy Flags of the United States Navy.

By Instructor H. C. Washburn, U. S. N. A. This is a book that officers in the service will be glad to own and keep at hand as an object lesson to their friends of the navy's history.

133 pages. Paper binding, price 85 cents. Cloth binding, price $1.10. Postage paid.

Book Department

The Institute Book Department will fill orders for obtainable books of all kinds, furnishing them at retail prices, postage prepaid

BOOK LISTS

Many inquiries having been received concerning books suitable for training and instruction of individuals, schools and naval organizations, we venture to submit suggestive lists of such works. We do not claim that these lists are complete or that the works mentioned are the best of their class; we do, however, vouch for them as of proved value and recommend them as supplementary to the Naval Institute's "List of Publications."

NAVIGATION

(Complete Course)

Title	Approx. price	Publisher
Navigation and Compass Deviations, Muir	$ 4.20	Naval Institute.
American Practical Navigator, Bowditch	2.25	Hydrographic Office.
Practical Manual of Compass	1.50	Naval Institute.
Altitude, Azimuth and Line of Position Tables (includes Aquino's Tables) H. O. 200.	.60	Hydrographic Office.
Navigation and Nautical Tables	4.00	Inter. Text Book Co.
Nautical Astronomy and Ocean Navigation.	4.00	Inter. Text Book Co.

SEAMANSHIP

Modern Seamanship, Knight	$ 6.50	Van Nostrand Co.
Fundamentals of Naval Service, Sterling	2.00	Lippincott.
(Valuable general information for officers and petty officers of the Reserve and Naval Militia.)		
Watch Officer's Manual, Hovey (1917)	1.10	Naval Institute.

ORDNANCE AND GUNNERY

Elastic Strength of Guns, Alger	$ 2.00	Conroy, Naval Inst.
Interior Ballistics, Ingalls	3.00	Brentano.
Suggestions to Military Riflemen, Whelan	1.00	Brentano.
Military Explosives, Weaver	3.25	Wiley.
Modern Explosives (2 vols.), Marshall	16.00	Blackiston.
Explosives, Brunswig	3.00	Wiley.

MARINE ENGINEERING

Mechanical Engineer's Hand Book, Kent	$ 5.00	Wiley.
New Mechanical Engineer's Hand Book, Marks	5.00	McGraw-Hill.
Practical Marine Engineering, Dyson	6.00	Marine Engineering.
Electric Propulsion of Ships, Hobart	2.00	Van Nostrand.
Marine Gas Engines, Clark	1.50	Van Nostrand.
Internal Combustion Engines, Stirling	1.75	Lord Baltimore Press.
Diesel Engines for Land & Marine Work, Chalkley	4.00	Van Nostrand.

ELECTRICAL ENGINEERING

Elementary Manual of Radio Telegraphy and Radio Telephony for Students and Operators, Fleming	$ 2.00	Longmans, Green & Co.
Wireless Telegraphy, Zenneck	4.00	McGraw-Hill.
Standard Hand Book for Elec. Engineers, Towle	5.00	McGraw-Hill.
American Hand Book for Elec. Engineers, Pender	5.00	John Wiley & Sons.
Storage Battery Engineering, Lyndon	4.00	McGraw-Hill.
American Telephone Practice, Miller	4.00	McGraw-Hill.
Principles of Electric Wave Telegraphy and Telephony	10.00	Longmans, Green & Co.
The Range of Search-Light Projectors	4.50	D. Van Nostrand Co.

Lists of standard works on electrical engineering, general, will be furnished on request for specific information.

NAVAL CONSTRUCTION

Naval Architecture, Hovgaard	$ 5.50	Spon & Chamberlain.
Theoretical Naval Architecture, Atwood	10.00	Longmans, Green & Co.
Speed and Power of Ships, Taylor	7.50	Wiley.
Screw Propellers, Dyson	7.50	Van Nostrand.

AVIATION

Aircraft in Warfare, Lancaster	$ 4.00	Brentano.
The Aeroplane, Fage	2.00	Lippincott.
Military Aeroplanes, Loening	4.75	Aeronautic Library.
Mechanics of the Aeroplane, Duchene	2.50	Longmans, Green & Co.
Text Book of Naval Aeronautics, Woodhouse	6.00	The Century Co.
Aero Engines, Burls	3.50	Lippincott.
Zeppelins and Superzeppelins, Hearne	1.00	John Lane.

These books can be obtained through the Institute's Book Department at the retail price, postage prepaid.

Secretary and Treasurer,
U. S. Naval Institute.

THE

NAVY LEAGUE

OF THE UNITED STATES

Has been doing its part to help the Navy

JOIN THE NAVY LEAGUE AND HELP US WITH OUR TASK

SEA POWER

THE NATION'S DEFENSE

The League's Official Organ

WILL KEEP YOU IN TOUCH WITH OUR WORK

1201 SIXTEENTH STREET, WASHINGTON, D. C.

TEAR OFF AND MAIL THIS COUPON

APPLICATION FOR MEMBERSHIP IN THE NAVY LEAGUE OF THE UNITED STATES

Of the membership fee $1.50 is for a year's subscription to SEA POWER. Subscription to SEA POWER without membership, $2.50.

DUES:

Annual Member	$ 3.00 annually
Contributing Member	5.00 annually
Life Member	100.00 one payment

"SEA POWER," a beautifully illustrated magazine, is sent monthly to all members.

TO THE NAVY LEAGUE,
1201 Sixteenth Street, Washington, D. C.

I am in sympathy with the objects of the Navy League and desire to be enrolled as a.....member. I enclose $.....for fees,
(*Indicate class of membership*)
$1.50 of which is for a year's subscription to SEA POWER.

.....
(Name)

.....
(Address)

N. I. 517 .....

JOURNAL OF THE UNITED STATES ARTILLERY

PUBLISHED BIMONTHLY AT FORT MONROE, VIRGINIA, UNDER SUPERVISION OF THE SCHOOL BOARD, COAST ARTILLERY SCHOOL

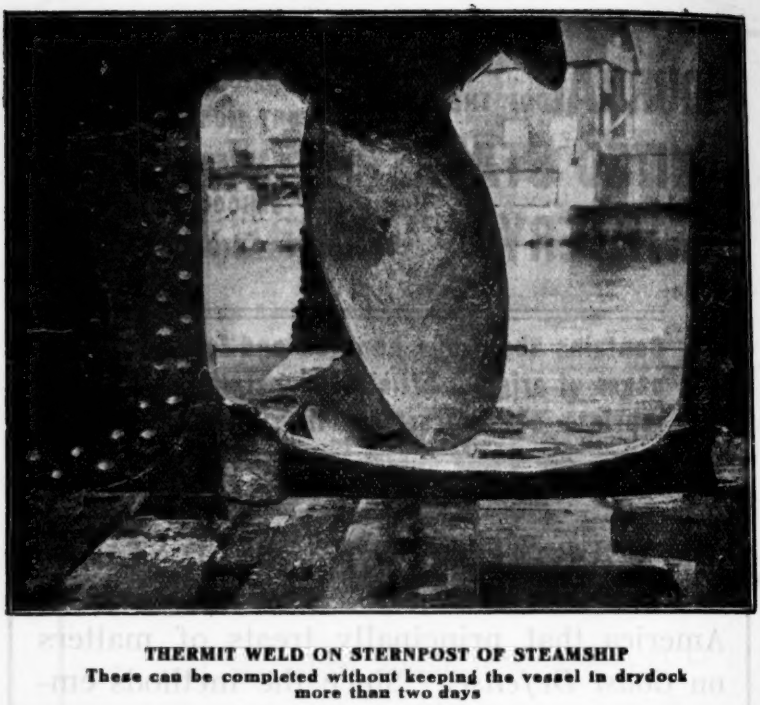
Contains about one hundred and forty-four pages of original articles, translations, and reprints of interest to the Artilleryman

The JOURNAL OF THE UNITED STATES ARTILLERY is the only publication in America that principally treats of matters on *Coast Defense.* Since the methods employed in *Coast Defense* are based on an application of Civil, Mechanical, and Electrical Engineering, including Aeronautics and Motor Traction, the JOURNAL cannot fail to be of value to all civilians having a technical education and interested in our NATIONAL COAST DEFENSE.

SUBSCRIPTION RATES: United States, Cuba, and Mexico, $2.50; Foreign postage, $0.50 per year extra; Canadian postage, $0.25 per year extra. Single copy, $0.50.

Write to JOURNAL for a sample copy

Club Rates Discontinued



THERMIT WELD ON STERNPOST OF STEAMSHIP
These can be completed without keeping the vessel in drydock more than two days

If It's Something Broken Think of "THERMIT"

Then wire or send particulars giving full dimensions of the break to our nearest office. We do the rest.

Sternposts, rudder frames, connecting-rods, crank-shafts, crossheads and other such sections too numerous to mention have been saved and returned to service in a few hours.

A permanent repair is assured, as Thermit upon reaction produces liquid steel at a temperature of 5000° F. When this liquid mass is poured into a mold surrounding the broken parts it melts up the ends of the sections and amalgamates with them to form one solid mass when cool.

The whole story is told in our pamphlet No. 2928 and "Reactions." Get this literature and keep it for reference.

Goldschmidt Thermit Company

The Equitable Building, 120 Broadway, New York, N. Y.

329-333 Folsom St., San Francisco — 7300 So. Chicago Ave., Chicago
103 Richmond St. W., Toronto, Ont.

NOTICE TO MEMBERS

An increase in membership invariably means

NOTICE TO MEMBERS

More members, both regular and associate, are much desired. Any increase in membership invariably means larger number of papers and essays submitted, and consequently an improvement in the PROCEEDINGS.

You are requested to send or give the attached slip to some one eligible for membership, urging him to join.

By direction of the Board of Control,

I. C. KIDD,
Secretary-Treasurer.

CONSTITUTION, Art. VII, Sec. 8.—"The annual dues for regular and associate members shall be two dollars, payable upon joining the Institute and upon the **FIRST DAY OF EACH SUCCEEDING JANUARY.** The fee for life membership shall be thirty dollars." There is no initiation fee.

.....

.....*191*

To the Secretary and Treasurer,
U. S. Naval Institute,
Annapolis, Md.

Dear Sir:

Please enroll my name as a { *regular* / *associate* } *member of the U. S. Naval Institute from this date.*

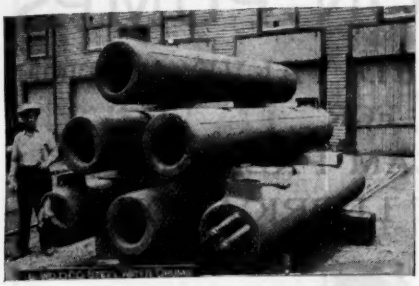
Very truly yours,

.....

.....

WELDED STEEL STEAM AND WATER DRUMS

FOR WATER TUBE BOILERS



Embodying Strength with Lightness and Freedom from Leakages incident to riveted Structures

Morison Suspension Furnaces

Fox Corrugated Furnaces

Welded Steel Tanks, Receivers, etc.

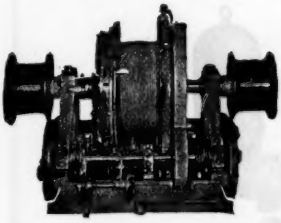
THE CONTINENTAL IRON WORKS

ESTABLISHED 1859
INCORPORATED 1887

West and Calyer Sts. BOROUGH OF BROOKLYN, N. Y.
Greenpoint Ferry from East 23rd Street, New York

LIDGERWOOD

Ship's Winches and Steering Engines



IMPROVED DESIGNS

BUILT ON DUPLICATE PART SYSTEM

Improved Metallic Slip Friction Winch

Lidgerwood Mfg. Co., 96 Liberty St., New York

For Space and Rates in our advertising pages communicate with the

SECRETARY AND TREASURER
U. S. NAVAL INSTITUTE
ANNAPOLIS, MD.

and not with our former agent

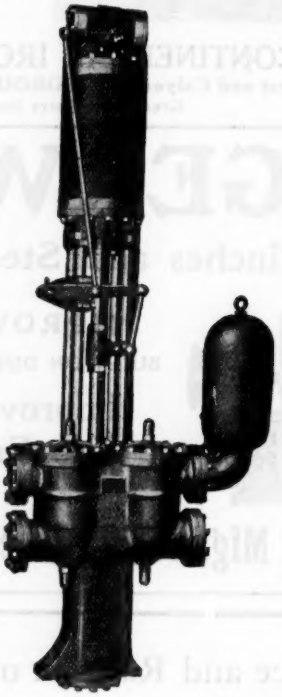
DAVIDSON PUMPS

WITH IMPROVED VALVE MOTION

FOR

HIGH STEAM PRESSURE

WITHOUT LUBRICATION



M. T. DAVIDSON COMPANY

43-53 Keap St., Brooklyn, N. Y.

154 Nassau St.
New York

32 Oliver St.
Boston

25,000 NAVY MEN NOW READ

PACIFIC

NAVAL MONTHLY

ESTABLISHED IN 1911

Published by

NAVAL PUBLISHING COMPANY INC.

In the Interest of the United States Nav

Official and Authentic European, Atlantic Fleet, Pacific Fleet and Asiatic Navy News

Feature Articles by Recognized Naval Authorities

Timely Illustrations from the Foremost European and American Photo News Services

To any Address Postpaid $1.50 Per Year

Agents on U. S. Naval Vessels and Stations

201 Bremerton Trust Building
Bremerton, Wash.

307 Chronicle Building
San Francisco, Cal.

83 Columbia Street
Seattle, Wash.

Underwood Typewriter

The UNDERWOOD is designed on correct mechanical principles, is made of the best material, and is unequaled in speed, accuracy, ease of operation and durability.

Underwood sales exceed those of any other machine.

"The Machine you will eventually buy"

Underwood Typewriter Company

1206 F St. N. W. Washington, D. C.

Ford Instrument Company, Inc.

(Ford Marine Appliance Corporation)

Engineers and Manufacturers

80 Lafayette Street
New York

Scientific Instruments
Automatic Machines
Variable Speed Drive
Naval Fire Control Apparatus

F. J. SCHMIDT CO.

Navy and Army Tailors

A COMPLETE LINE OF GOODS FOR CIVILIAN DRESS

ANNAPOLIS, MD.

Phone No. 241

Established 1896

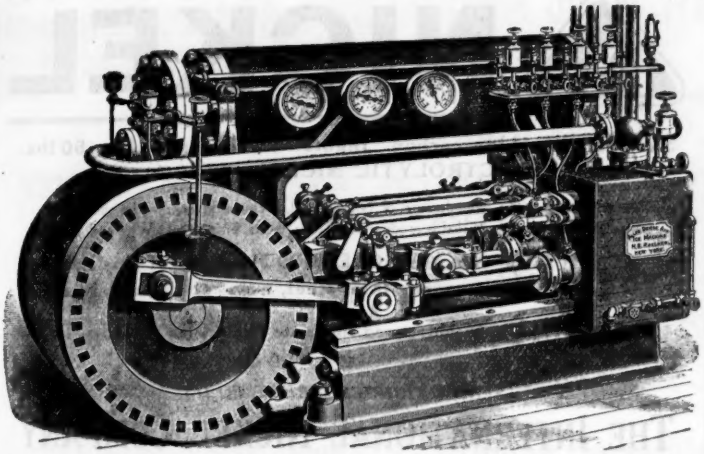
HERMAN COHN

45 Sands Street, Brooklyn, N. Y.

Our Specialty
Outfitting
Chief Petty and
Warrant Officers

Branch Stores
712 Crawford St., Portsmouth, Va.
275 Thames St., Newport, R. I.

THE ALLEN DENSE AIR ICE MACHINE



Contains only air of 75 lbs pressure in refrigerating pipes. At about 30 degrees below zero when seawater is at 90 degrees. More than two hundred in use on U. S. Naval vessels. Some since 1888.

H. B. ROELKER, 41 Maiden Lane, New York

AMERICA'S SHIPBUILDERS

HAVE ORDERED

REILLY APPARATUS

FOR THE MAJORITY OF SHIPS NOW BUILDING FOR

Feed Water Heaters
Evaporators
Distillers
Evaporator Feed Heaters

The United States Navy
AND
The Merchant Marine

Fuel Oil Heaters
Grease Extractors
Oil Coolers
Filters, etc.

WRITE FOR BULLETINS

THE GRISCOM-RUSSELL CO.

2152 WEST ST. BLDG. :-: NEW YORK

I·N·C NICKEL

Shot—High and low carbon. Ingots—Two sizes, 25 lbs., 50 lbs.
ELECTROLYTIC NICKEL—99.80%

Prime Metals for the Manufacture of Nickel Steel, German Silver, Anodes and all re-melting purposes. Our Nickel is produced as Rods, Sheets, Strip Stock, Wire and Tubes

MONEL METAL
Trademark
Reg U. S. Pat. Off.

We are SOLE PRODUCERS of this natural stronger-than-steel, non-corrodible alloy

Manufactured forms are Rods, Flats, Castings, Tubes, Sheets, Strip Stock and Wire

SEND INQUIRIES DIRECT TO US

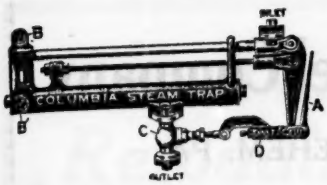
THE INTERNATIONAL NICKEL COMPANY

43 EXCHANGE PLACE, NEW YORK

The Lord Baltimore Press

PRINTERS AND BOOKBINDERS

BALTIMORE, MD., U. S. A.



The Columbia Steam Trap

IS A WONDER.

Especially adapted for Marine use

WE ALSO MANUFACTURE

REDUCING VALVES, PUMP GOVERNORS, BLOW OFF VALVES AND OTHER SPECIALTIES.

WATSON & McDANIEL CO.

146 N. 7TH STREET, PHILADELPHIA, PA.

SEND FOR CATALOGUE NO. 20.

ESTABLISHED 1844

A. Schrader's Son, Inc. Manufacturers of Diving Apparatus

We make Divers' outfits of all kinds, and invite inquiries from Wreckers, Contractors, Bridge Companies, Water Works, or any one who is thinking of using an Apparatus.

FURNISHER OF

DIVING APPARATUS

TO U. S. NAVY

and

U S. ARMY ENGINEERS' CORPS

783-791 ATLANTIC AVE. BROOKLYN, N. Y.

The Marine Corps Score Book

A Rifleman's Instructor

For use in Army, Navy, Marine Corps, National Guard, Naval Militia, Schools and Civilian Clubs.

For beginners, advanced riflemen and rifle teams. For self-instruction and for use in instructing others

It is the boil-down of the shooting game. Its contents are the digest of range practice and experience. Everything in it is practical, easy to learn and easy to teach. It is the last word in accuracy of the art of shooting, instructing and range service.

Supply it to your Company, Club or Team. It will save you labor. Your men will then instruct themselves. Your subordinates can teach it. It will produce results for you with the minimum of work.

Adopted by the War Department and issued by the Ordnance Department to organizations of the Army, and to the Organized Militia (under Sec. 1661 R. S.), and for sale to educational institutions (Bulletin No. 12, 1916, and G. O. No. 1, 1916).

Remittance should accompany order. Stamps accepted for orders less than $1.00

Price, 20 Cents, Post Paid **Discount of 20% on quantities of 50 or more copies**
Delivery Charges Collect

INTERNATIONAL PRINTING CO.

236 Chestnut Street, Philadelphia

Bethlehem Steel Company

SOUTH BETHLEHEM, PA.

Naval, Field and Coast Defence

GUNS and MOUNTS

Armor Plate Turrets Projectiles

Fuzes Cartridge Cases

Castings Shafting Forgings

Rails Structural Steel

Proving Grounds at

REDINGTON, PA. CAPE MAY, N. J.

Manufacturers of Ordnance Material for

U. S. Navy U. S. Army

and for the Governments of

Great Britain France Russia Italy

Greece Chile Argentina Guatemala

Cuba Spain Etc. Etc.

Are You Reloading ?

Send Us

The Name and Caliber

Of Your Rifle

Rifle Smokeless Division

E. I. du Pont de Nemours & Co.

Wilmington, Del.

READ

It is a monthly magazine devoted to the interests of the United States Naval Service and to the discussion of international questions that affect American Interests and American Foreign Policy.

$2.00 per year - - Sample copy free

THE NAVY PUBLISHING CO.

518 SOUTHERN BUILDING - WASHINGTON, D. C.

ELECTRIC BOAT
COMPANY

11 Pine Street, New York City

BUILDERS OF THE

Holland Submarine Boats

U. S. NAVAL INSTITUTE
PROCEEDINGS
Number 178